MultiAccess® ACS
Analog Communications Server

MA100-1M

User Guide
MultiAccess ACS User Guide
MA100-1M
PN S000351D, Version D

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Revisions

<table>
<thead>
<tr>
<th>Revision Level</th>
<th>Date</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>07/22/05</td>
<td>Initial release.</td>
</tr>
<tr>
<td>B</td>
<td>04/13/06</td>
<td>Added modem sharing and call-back security.</td>
</tr>
<tr>
<td>C</td>
<td>07/14/06</td>
<td>Change to single mounting bracket and changed mounting dimension.</td>
</tr>
<tr>
<td>D</td>
<td>06/22/07</td>
<td>Manual revised to include software version 1.03.</td>
</tr>
<tr>
<td></td>
<td>05/13/09</td>
<td>Added web link for warranty information.</td>
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Fax: 763-785-9874

Technical Support

<table>
<thead>
<tr>
<th>Country</th>
<th>By Email</th>
<th>By Phone</th>
</tr>
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<tbody>
<tr>
<td>Europe, Middle East, Africa</td>
<td><a href="mailto:support@multitech.co.uk">support@multitech.co.uk</a></td>
<td>+(44) 118 959 7774</td>
</tr>
<tr>
<td>U.S., Canada, all others:</td>
<td><a href="mailto:support@multitech.com">support@multitech.com</a></td>
<td>(800) 972-2439 or (763) 785-3500</td>
</tr>
</tbody>
</table>

Warranty

To read the warranty statement for your product, please visit: http://www.multitech.com.
Table of Contents

Chapter 1 – Product Description & Specifications ............................................................... 5
  Product Description ........................................................................................................... 5
  Features ............................................................................................................................ 5
  Package Contents ............................................................................................................ 6
  Handling Precautions ....................................................................................................... 6
  LED Indicators .................................................................................................................. 6
  Product Specifications ...................................................................................................... 6

Chapter 2 – Installation ....................................................................................................... 7
  Attaching the MultiAccess ACS to a Fixed Location ......................................................... 7
  MultiAccess ACS Connections ......................................................................................... 8

Chapter 3 – Configuring Your MultiAccess ACS ............................................................... 9
  Setting Admin PC to Startup IP Address ......................................................................... 9
  Logging In ....................................................................................................................... 9
  Setting MA100-1M IP Addresses ..................................................................................... 10
  Resetting Admin PC to Its Original IP Address ............................................................... 10
  Logging In Again ............................................................................................................ 10
  Time Configuration ........................................................................................................ 10
  Setting Up the Mail Server ............................................................................................ 11
  Modem Setup ................................................................................................................ 11
  Setting Authentication .................................................................................................... 13
  Setting Up Local Users .................................................................................................. 14

Chapter 4 – Software ........................................................................................................ 15
  Home Screen .................................................................................................................. 15
  Login Screen ................................................................................................................... 16
  Call Log Screen .............................................................................................................. 17
  Call Log .......................................................................................................................... 18
  Call Details ....................................................................................................................... 18
  Current Status Screen ..................................................................................................... 19
  Logout Option .................................................................................................................. 20
  Help Screen .................................................................................................................... 20
  Administration Screen .................................................................................................... 21
  Local Users Data Base Screen ......................................................................................... 23
  Modem Setup ................................................................................................................ 24
  Authentication Screen .................................................................................................... 25

Chapter 5 – Troubleshooting ............................................................................................ 26

Appendix A – Device Manager Utility ............................................................................ 28
  Adding a Device to the Manager .................................................................................... 29
  Set Local User Sharing .................................................................................................... 30
  Synchronize Phonebooks/Local Users ............................................................................. 31
  Updating Firmware ........................................................................................................ 32
    MultiAccess ACS Modem Firmware Update ................................................................. 32
    MultiAccess ACS Firmware Update ............................................................................ 35

Appendix B – Regulatory Information ............................................................................ 38
  47 CFR Part 68 Telecom ................................................................................................. 38
  47 CFR Part 15 Regulation .............................................................................................. 39
  Fax Branding Statement ................................................................................................. 39
Chapter 1 – Product Description & Specifications

Product Description

The MultiAccess ACS single-port communications server provides connectivity to the corporate LAN for telecommuters and mobile users, or to remotely installed equipment, via one integrated V.92/56K modem. MultiAccess’ small size makes it ideal for users who need remote access on a limited basis, but don’t have room for a larger system or where remote access is needed on a temporary basis for remote diagnostics.

![MultiAccess ACS Image]

The MultiAccess ACS has two roles (usage), RAS and Modem Sharing.

RAS Solution: The MultiAccess can be used as a dial-in PPP Remote Access Server in a LAN to Client environment. The purpose is to give a remote node (i.e., Microsoft Dial-up Networking clients) IP access to the same subnet and LAN the ACS is installed on. Masquerading (NAT) and LAN to LAN routing (assignment of an entire subnet) are IP networking techniques not supported by the ACS. The supported PPP security protocol (means of communicating user credentials between PPP end points) is PAP only.

Modem Sharing Solution: The modem in the ACS can be a shared resource on your network. Computers with network access to the ACS can use Telnet on port 7000 and get direct AT command access to the modem in the ACS, for either outbound or inbound calls. A common way to take advantage of this role is by installing Com Port Redirector Software (i.e., Multi-Tech’s MCSI2000 for Windows) on your workstation(s). The redirector adds a virtual com port to the workstation and uses Telnet to map, redirect, the com port to the modem. The redirector and Telnet session replaces the UART based hardware of a PC and serial cable connection normally found in traditional modem installations. A communication program using this virtual com port has its data redirected to and from the modem within the ACS, making the modem appear as if it is directly attached to a communication port on the workstation.

MCSI2000 Utility is provided on the MultiAccess CD and a summary of the parameters are presented in Appendix E.

Modem AT Commands are presented in Appendix F.


Features

- One integrated V.92/56K modem
- Supports dial-out for clients on IP networks
- Modem supports V.92/56K dial-out and V.34/33.6K dial-in connections
- Client authentication provided through RADIUS or local database
- Callback security using local database
- Connects to 10/100BaseT Ethernet
- Industry-standard PPP client support
- Web server interface for system configuration and management
- Flash memory on modem and server for easy updates
- Two-year warranty
Package Contents

The MultiAccess package contains:

- One MultiAccess ACS
- One universal power supply with power cord
- One mounting bracket
- Four adhesive-backed rubber feet for table-top mounting
- One Quick Start Guide
- One product CD

Handling Precautions

All Devices must be handled with certain precautions to avoid damage due to the accumulation of static charge. Although input protection circuitry has been incorporated into the Devices to minimize the effect of this static buildup, proper precautions should be taken to avoid exposure to electrostatic discharge during handling and mounting.

LED Indicators

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD</td>
<td>Transmit Data – Lit when transmitting data</td>
</tr>
<tr>
<td>RD</td>
<td>Receive Data – Lit when receiving data</td>
</tr>
<tr>
<td>CD</td>
<td>Carrier Detect – Lit when a valid carrier signal is detected</td>
</tr>
<tr>
<td>LNK</td>
<td>Link – Lit when network data connection has been established.</td>
</tr>
<tr>
<td>ACT</td>
<td>Activity – Lit when network data is being transmitted or received.</td>
</tr>
<tr>
<td>PWR</td>
<td>Power – Flashes as a heart beat when unit is functioning normally. If the processor is locked up, this LED is on all the time.</td>
</tr>
</tbody>
</table>

Product Specifications

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN Port</td>
<td>10/100BaseT Ethernet</td>
</tr>
<tr>
<td>WAN Port</td>
<td>V.92/56K modem</td>
</tr>
<tr>
<td>Data Rates</td>
<td>V.92/56K downloads and 48K uploads speeds from V.92 servers; V.90/56K downloads from V.90/K56flex servers; 33.6K bps transfers with other servers.</td>
</tr>
<tr>
<td>Standards</td>
<td>Data: V.92, V.90, enhanced V.34 &amp; below</td>
</tr>
<tr>
<td></td>
<td>Error Correction: V.42</td>
</tr>
<tr>
<td></td>
<td>Data Compression: V.44, MNP® Class 5; V.42bis</td>
</tr>
<tr>
<td>System Management</td>
<td>Web based - HTTP</td>
</tr>
<tr>
<td>Security</td>
<td>Local database or RADIUS support</td>
</tr>
<tr>
<td>Power Usage</td>
<td>Typical – 1.6W (175mA @ 9VDC)</td>
</tr>
<tr>
<td></td>
<td>Maximum – 2.2W (225mA @ 9.9VDC)</td>
</tr>
<tr>
<td>Power Supply</td>
<td>100-240VAC; 50/60Hz universal input or 120VAC; 60Hz</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>32° to +120°F (0° to 50°C); humidity range 20-90% (non-condensing)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>Physical Dimensions</td>
<td>4.3” w x 2.4” h x 0.94” d; 4.5 oz.</td>
</tr>
<tr>
<td></td>
<td>11 cm x 6.1 cm x 2.4 cm; .14K g</td>
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<tr>
<td>Certifications</td>
<td>CE Mark</td>
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<tr>
<td></td>
<td>EMC: FCC Part 15 Class B, EN55022, EN55024</td>
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<tr>
<td></td>
<td>Safety: UL 60950, En60950</td>
</tr>
<tr>
<td></td>
<td>Telecom: 47CFR Part 68, CS03, TBR21</td>
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<tr>
<td></td>
<td>Other countries also included</td>
</tr>
</tbody>
</table>
# Chapter 2 – Installation

## Attaching the MultiAccess ACS to a Fixed Location

The MultiAccess is designed to be used on the desktop or to be panel-mounted. To attach the bracket for panel-mounting, follow these steps:

1. Typically, the MultiAccess is mounted against a flat surface with two mounting screws. Drill the mounting holes at the desired location. The mounting holes must be separated by 4 15/16 inches center-to-center.

   ![Screw Separation Diagram](image)

   **Screw Separation**
   
   4 15/16 inches

2. To attach the bracket to the MultiAccess, slide the mounting bracket into the corresponding slots on the back of the MultiAccess chassis.

   ![Mounting Bracket Diagram](image)

3. Attach the adapter to the surface with two screws.
MultiAccess ACS Connections
The MT100-1M is supplied power through an external power supply.

1. Plug the DC power transformer into the power outlet or power strip. Secure the other end to the PWR on your MultiAccess. The DC power transformer is included with your MultiAccess.
   
   Caution: Use only the DC power transform supplied with the MA100-1M. Use of any other transformer voids the warranty and can damage the unit.

2. After power is applied, there is a 4-second delay before the PWR LED comes on. In normal operation, the PWR LED will be flashing.

   When you apply power, the MA100-1M performs a diagnostic self-test. The PWR indicator flashes as a heart beat indicating that the processor is functioning correctly. If the PWR indicator does not come on, check that the power supply is solidly connected and that the AC outlet is live. If the PWR indicator flashes as a heart beat, then comes on solid, this indicates a malfunction within the unit.

3. Plug one end of your RJ45 Ethernet cable into the MA100-1M’s Ethernet jack and the other end into your network Ethernet hub. This Ethernet cable is not included with your MA100-1M unit.

   Caution: Before connecting to the Ethernet Network, make sure that the network to which you are connecting the MA100-1M is not a 192.168.2.x subnet. Because the MA100-1M’s factory default IP address is 192.168.2.1, connecting it to a network that has a different Device at that same IP address would cause data interference.

   If it is a 192.168.2.x subnet, connect from the Administrative PC to the MA100-1M using an RJ45 crossover cable until the MA100-1M’s IP address has been configured. Thereafter, connect the MA100-1M into the network with an ordinary RJ45 cable.

4. Plug one end of a phone cable into the telephone wall jack and the other end into the LINE jack on the MA100-1M.
Chapter 3 – Configuring Your MultiAccess ACS

Setting Admin PC to Startup IP Address

1. Connect a PC to your network. Record the original PC’s IP address before you change it.
2. Set the PC IP address to 192.168.2.x subnet (using any address excluding 192.168.2.1).

Logging In

1. Bring up a Web browser on your PC. At the browser’s address line, type the default address of the MA100-1M: http://192.168.2.1 and press Enter.
2. The Login screen will appear.

At this point you can be assured that the MA100-1M is connected to the network.
If the Login screen does not appear, see item #1, “What if I can’t see the web page for my MA100-1M?” in Chapter 5: Troubleshooting.

3. At the Login screen, enter admin (all lower case) in the Username field.
4. Enter admin (all lower case) in the Password field.
5. Click the Login button. The Home screen will appear. From this screen, you can access all of the MA100-1M software screens.
**Chapter 3: Configuring your MultiAccess ACS**

### Setting MA100-1M IP Addresses

1. In the MA100-1M Administration screen, go to the IP Configuration fields.

![IP Configuration Fields](image)

2. Fill in the IP information that applies to your MA100-1M unit. The fields for “IP Address,” “Subnet Mask,” “Default Gateway” and “Name Server” are required. A “Secondary Name Server” is optional.

3. Click Update. After the Update button has been clicked, it takes 5 seconds for the MA100-1M to update the addresses.

### Resetting Admin PC to Its Original IP Address

In Setting the Admin PC to the network number of the MultiAccess, you recorded the original IP address of the administrator’s PC and then reset it to the IP address required to allow communication with the MA100-1M unit. You may now set the IP address of the administrator’s PC back to its original value or to any other value that will allow you to communicate with the MA100-1M at its new IP address.

### Logging In Again

Having reset the IP address of the administrator’s PC, you must log into the MA100-1M software again with the MA100-1M’s new IP address. Go to the Login screen, enter admin as User Name and admin as Password.

### Time Configuration

1. In the MultiAccess Administration screen, go to the Time Configuration fields.

![Time Configuration Fields](image)

2. In the Time Server window, select from the three time server URLs. The default is time.nist.gov. The Time Server is a substitute for a real-time clock in the MultiAccess.

   If you would like to add your own time server, you can enter the URL or IP address of your time server in the Add Time Server window.

3. In the Request Interval window, select the Days, Hours, and Minutes that the MultiAccess will update its clock from the time server.

4. If you are in daylight savings time, check the Use Daylight Savings Time (DST) box.

5. In the Time Zone, Date Format, and Time Format windows, choose the options for your time zone.

6. Click the update button to change to your new parameters.
Chapter 3: Configuring your MultiAccess ACS

Setting Up the Mail Server

1. From the Administration screen, go to the SMTP Configuration fields.

2. Enter the mail server address in the **SMTP Server Address** window (e.g., mail.multitech.com or IP address).

3. Enter the SMTP Port (usually 25) that is used as the SMTP Server.

4. Enter the E-mail address of the administrator in the **Administrator E-mail** window.

5. If the SMTP Server requires a User ID, enter the ID in the **SMTP Server User ID** window.

6. If the SMTP Server requires a password, enter the password in the **SMTP Password** window.

7. If you enter a password, retype the identical password in the **Retype SMTP Password** window.

8. Click on **Update**. At this point the MA100-1M will send the Administrator an email saying that the mail server address has been updated.

Modem Setup

The Modem Setup menu group defines the Modem Sharing behavior and the General Modem Setup Group defines the Country Code and number of rings before auto answer.

If you are using your MultiAccess for dial-in PPP access (RAS solution), you do not have to modify Modem sharing, but, you have to select the Country Code. If you are using your MultiAccess for dial-out, you will have to select one of the Modem Sharing options and select the Country Code.

With any of the Modem Sharing options, the TCP port number used to access the modem is 7000. Modem Sharing with authentication means a login prompt will be issued to the socket when it is opened. Who (what) ever opened the socket must provide appropriate credentials before access is given to the modem. If RAW is also selected – support for RFC 2217 (com port control via Telnet) will be disabled.

1. If you are using your MultiAccess for dial-in PPP access (RAS), click on the **Country Code** down arrow and choose your country/region. Click on the **update** button to save your selection.

Caution: Modem sharing is accomplished by implementing a Telnet interface to the MultiAccess modem. Secure the access to the port via a firewall or IP filter settings to prevent unauthorized use of your modem resource.

**No Authentication.** Immediate access is given to the modem.
Local Authentication. A valid set of credentials, defined in the Local User data base, is required before access is granted.

Radius Authentication. A valid set of credentials, defined in the Radius User data base, is required before access is granted.

Raw Mode with No Authentication. User data is treated “as is”, without interpretation, and no authentication is required.

Raw Mode with Local Authentication. User data is treated “as is”, without interpretation, and a valid set of credentials, defined in the Local User data base, is required before access is granted.

Raw Mode with Radius Authentication. User data is treated "as is", without interpretation, and a set of credentials, defined in the Radius User data base, is required before access is granted.

2. Select your Country Code by clicking on the down arrow and choose your country/region.
3. If the modem is being used for in-bound calls, select the number of ring(s) for auto answer.
4. Click Update
Setting Authentication

Authentication Type option defines where the database of user credentials reside. Local Authentication refers to the Local User Database on the MultiAccess. Radius Authentication refers to a user database controlled by a Radius Server outside the MultiAccess.

If a Radius Server is used for authentication, then the server has to be configured to receive requests from the MA100-1M.

For RAS calls, dial-in PPP, a second static IP address is needed in the Remote Host Address field. This address is for the dial-in user, PPP server. This address needs to be on the same subnet, network number as that of the MultiAccess.

Remote Host Address is not used if the modem sharing is set for authentication.

Radius Client Setup points to the Radius Server when the Authentication is Radius.

Authentication

1. In the Authentication Type, if your database for user credentials reside in the Local User Database on the MultiAccess, then accept the default – local.

   If your user database resides on a Radius Server outside the MultiAccess, then click on the down arrow and choose radius.

2. For RAS calls, enter a static IP Address in the Remote Host Address window which will be assigned to the dial-in user. This Remote Host Address has to match the network number of the MultiAccess.

RADIUS

1. If you are setting up MultiAccess to use Radius authentication, then enter the IP address of the primary RADIUS Server in the RADIUS Server Address 1 window.

2. Enter the port number (usually port 1812) for the RADIUS Server in the top Port window.

3. Enter the IP address of the Radius Accounting server in the RADIUS Accounting Address 1 window.

4. Enter the port number (usually port 1813) for the Radius Accounting Server in the bottom Port window.

5. Enter the Secret of the Radius Server that you are communicating with. The Secret has to be identical to the one used by your Radius Server and is limited to 14 alphanumeric characters.

6. Click on the Update button to save your port configuration.
Setting Up Local Users

The administrator builds the Local Users database defining the Name field, recording the User ID, Password entries, and callback method. The administrator account has both administration of the MA100-1M and dial-in rights. The user accounts only have rights to use the modem. The remote user enters their user ID and password during the dial-in session.

For Local Authentication, go to the Local Users screen.

**Note:** The first row is for the "Administrator" function. No matter what values are used for the Name, User ID and Password fields, the first row will still apply to the person doing the Administrator function for the MA100-1M. The Administrator is the party privileged to configure the MA100-1M.

**Administrator Row:**
1. In the “Administrator” row of the Local Users screen, enter the Name and User ID to be used for the MA100-1M administrator (it need not be literally "Administrator").
2. In the Password window, enter an alphanumeric password. Passwords can be as long as 21 characters, and are case-sensitive.
3. In the Confirm Password window, enter the identical alphanumeric password.
4. If the administrator is going to enable the Callback Security option, click on the Callback down arrow and choose the callback method. A fixed phone number is Admin specified or variable phone number is User specified.
   - If the Callback Security option is enabled and Admin specified is selected, then enter your fixed callback telephone number in the Callback # window.
   - If the Callback Security option is enabled and User Specified is selected, you do not enter a telephone number in the Callback # window. You enter the callback telephone number during the dial-in process.
5. Click on Update in the “Administrator” row. At this point, a Login screen will appear and you will be asked to log in again. Log in using the administrator’s User ID (as listed in the “User ID” column) and the administrator’s current password.
   **Caution:** If you change the admin password, you must be sure you remember your new password.

**Users Row:**
1. In the first blank row, enter the Name and User ID of your local user.
2. In the Password window, enter an alphanumeric password. Passwords can be as long as 21 characters, and are case-sensitive.
3. In the Confirm Password window, enter the identical alphanumeric password.
4. If you are going to enable the Callback Security option for a remote user, click on the Callback down arrow and choose the callback method. A fixed phone number is Admin specified or a variable phone number is User specified. For example, if a traveling sales person needs to be called back at their current location, they will provide the callback telephone number during the dial-in process.
   - If the Callback Security option is enabled and Admin specified is selected, then enter their fixed callback telephone number in the Callback # window.
   - If the Callback Security option is enabled and User specified is selected, you do not enter a telephone number in the callback # window. The remote user enters the callback number during the dial-in process.
5. Click the add button to include this local user in the database.
6. Repeat the User Row steps for each user you want to add to your local user database.
Chapter 4 – Software

In this chapter, we present the screens of the MultiAccess ACS software. We describe each field in each screen and some of the command buttons. (We do not describe command buttons that have functions that would be readily understood by users of Windows software. Examples of such self-evident functions include buttons like “OK,” “Cancel,” “Next,” etc.)

Home Screen

The MultiAccess Home screen offers access to all other MultiAccess software screens.
Login Screen

The MultiAccess Login screen is the primary security device for the Server software.

The MultiAccess has a default setting that allows use of “admin” as both the User Name and the Password at initial startup. After you have begun configuring your MultiAccess, you should change the password in the Local Users screen for the administrator account described later in this chapter.
Call Log Screen

The Call Log screen displays the parameters you can set for the Call Log entries and displays a call log entry for each call. The Log Parameters define the threshold number of entries and the number of entries retained in the log history. The Call Log summarizes each call and the Details button displays an in-depth look at the call from the individual initiating the call, when the call was connected, duration of the call, transmit and receive baud rates, to authentication status.

Log Parameters

<table>
<thead>
<tr>
<th>Column</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Log Threshold</td>
<td>Numeric 1 to 20 entries</td>
<td>The Auto Log Threshold is limited to 20 logs. The threshold is limited by the memory in the MultiAccess.</td>
</tr>
<tr>
<td>Log History</td>
<td>Numeric 1 to 20 entries</td>
<td>The Log History Entries defines how many Call Log entries are stored. The maximum number of Log History entries is limited by the memory in the MultiAccess and that limit is 20 entries.</td>
</tr>
</tbody>
</table>

Call Log

<table>
<thead>
<tr>
<th>Call Type</th>
<th>Time</th>
<th>Username</th>
<th>Rate</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>06/14/2005 11:58:35 AM</td>
<td>admin</td>
<td>33600</td>
<td>Details</td>
</tr>
<tr>
<td>Data</td>
<td>06/14/2005 10:52:33 AM</td>
<td>admin</td>
<td>33600</td>
<td>Details</td>
</tr>
<tr>
<td>Data</td>
<td>06/14/2005 10:50:13 AM</td>
<td>admin</td>
<td>33600</td>
<td>Details</td>
</tr>
<tr>
<td>Data</td>
<td>06/14/2005 10:49:04 AM</td>
<td>abc</td>
<td>33600</td>
<td>Details</td>
</tr>
<tr>
<td>Data</td>
<td>06/14/2005 10:48:08 AM</td>
<td>abc</td>
<td>33600</td>
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<td>Data</td>
<td>06/14/2005 10:47:02 AM</td>
<td>abc</td>
<td>33600</td>
<td>Details</td>
</tr>
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</table>

Log Parameters Field Definitions

<table>
<thead>
<tr>
<th>Column</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Log Threshold</td>
<td>Numeric 1 to 20 entries</td>
<td>The Auto Log Threshold is limited to 20 logs. The threshold is limited by the memory in the MultiAccess.</td>
</tr>
<tr>
<td>Log History</td>
<td>Numeric 1 to 20 entries</td>
<td>The Log History Entries defines how many Call Log entries are stored. The maximum number of Log History entries is limited by the memory in the MultiAccess and that limit is 20 entries.</td>
</tr>
<tr>
<td>Save Changes (button)</td>
<td></td>
<td>Click the Save Changes button save the threshold and history entries.</td>
</tr>
<tr>
<td>Send Log Now (button)</td>
<td></td>
<td>Click the Send Log Now button to</td>
</tr>
<tr>
<td>Delete Log (button)</td>
<td></td>
<td>Click the Delete Log button to remove Call Log entries</td>
</tr>
</tbody>
</table>
Call Log

<table>
<thead>
<tr>
<th>Column</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call Type</td>
<td>Data</td>
<td>Data call is the only type of call supported by MultiAccess.</td>
</tr>
<tr>
<td>Time</td>
<td>mm/dd/yyyy</td>
<td>Time that call was sent or received.</td>
</tr>
<tr>
<td>Username</td>
<td>alphanumeric</td>
<td>The name of the user generating or receiving the call.</td>
</tr>
<tr>
<td>Rate</td>
<td>33,600; 31,200; 28,800; 26,400; 24,000; 21,600; 19,200; 16,800; 14,400; 12,000; 9600; 7200; 4800; 2400; 1200; 0-300 bps</td>
<td>The data call transmission speed in bits per second at which the current call occurred.</td>
</tr>
<tr>
<td>Details</td>
<td></td>
<td>The Details button displays the details of that call.</td>
</tr>
</tbody>
</table>

Call Details

The Call Details screen displays the details of the call when the Details button was clicked for the call displayed in the Call Log. The Call Details present an in-depth view of the call from the individual initiating the call to the time it was connected, duration of the call, transmit and receive baud rates, authentication status, and much more.

![Call Details](image)
Current Status Screen

Current Status Field Definitions

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Time</td>
<td>weekday, mo, dd hh:mm:ss yyyy</td>
<td>The present time of day.</td>
</tr>
<tr>
<td>Pending Messages</td>
<td>numeric</td>
<td>Emails sent to the administrator that have not been opened. These can include debug log messages, mail server change notification message (relating to the “SMTP Server Address” field of Administration screen).</td>
</tr>
<tr>
<td>Email To:</td>
<td>Alphanumeric in email name format</td>
<td>The email address has to be entered in proper user@domain format.</td>
</tr>
<tr>
<td>Subject:</td>
<td>Alphanumeric</td>
<td>Title of the last pending or sent email.</td>
</tr>
<tr>
<td>Time Server Status</td>
<td>Initializing, No Errors, SNTP Error: type</td>
<td>The MultiAccess synchronizes its call time stamps to an Internet source, usually a government standards site. It will attempt contact with the standards web site 5 times in 20 seconds. If contact fails, it will try 5 times again 5 minutes later. If contact succeeds, the MultiAccess will update its stamping time periodically per an interval set in the Administration screen.</td>
</tr>
<tr>
<td>Field Name</td>
<td>Values</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>System group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up Time</td>
<td>(x) days (yy) hours: (zz) minutes</td>
<td>Operation time since last reboot.</td>
</tr>
<tr>
<td>Email Status</td>
<td>No Errors, Bad MailServer Address, Mail Server Connect Failed, SMTP Invalid Response, SMTP Client Timeout</td>
<td>Indicates whether the MultiAccess’s email transmissions, both calls and administrative messages, are proceeding with or without errors.</td>
</tr>
<tr>
<td><strong>POTS Modem1 group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>Waiting for Ring, Initializing Modem, Waiting for Connect, User login getting Call info</td>
<td>Indicates the modem’s current operating condition.</td>
</tr>
<tr>
<td>Connect Time</td>
<td>mm/dd/yyyy, hh:mm:ss</td>
<td>For the current call, the date and time at which the connection began.</td>
</tr>
<tr>
<td>Elapsed Time</td>
<td>numeric</td>
<td>The duration of the current call in seconds.</td>
</tr>
<tr>
<td>Initialize Modem (button)</td>
<td></td>
<td>Initializes the modem, clearing a busied-out state. This can only be done by a user with administrative rights.</td>
</tr>
<tr>
<td>Make Busy (button)</td>
<td></td>
<td>Imposes a busied state on the modem. This can only be done by a user with administrative rights.</td>
</tr>
<tr>
<td>Reset (button)</td>
<td></td>
<td>Click on this button to reset the unit to factory defaults.</td>
</tr>
</tbody>
</table>

**Logout Option**

When you click on Logout in the Home screen, you will be logged out of the MultiAccess software. The Login screen will appear to allow access to re-enter the program.

**Help Screen**

Online Help has not yet been implemented.
Administration Screen

The Administration Screen sets up the network addressing of the MultiAccess, communication with the SMTP name server, and defines the time stamp for the MultiAccess.

### Administration Screen Field Definitions

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IP Configuration Fields</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP Address</td>
<td>n.n.n.n</td>
<td>The IP address of the MultiAccess.</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>n.n.n.n</td>
<td>This subnet mask is the subnet for the network to which the MultiAccess is connected. A subnet mask is used in conjunction with the IP address to determine if a data destination is on the same immediate network or not. The default value, often used, is 255.255.255.0.</td>
</tr>
<tr>
<td>Name Server</td>
<td></td>
<td>The IP address of a local DNS server.</td>
</tr>
<tr>
<td>Default Gateway</td>
<td>n.n.n.n</td>
<td>Address used to route calls out of the immediate network.</td>
</tr>
<tr>
<td>Secondary Name Server</td>
<td>n.n.n.n</td>
<td>The IP address of a backup DNS server, which is typically at a separate location.</td>
</tr>
</tbody>
</table>
### Administration Screen Field Definitions

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IP Configuration Fields</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Update (button)</td>
<td></td>
<td>Click on this button to make changes to IP Configuration fields take effect.</td>
</tr>
<tr>
<td><strong>SMTP Configuration Fields</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMTP Server Address</td>
<td>Domain name or IP address for mail server (SMTP must be supported on mail server).</td>
<td></td>
</tr>
<tr>
<td>SMTP Port</td>
<td>Numeric</td>
<td>The default SMTP Port number is 25.</td>
</tr>
<tr>
<td>Administrator E-mail</td>
<td>Alphanumeric in email name format</td>
<td>The administrator’s email address. This address has to be entered in proper user@domain format</td>
</tr>
<tr>
<td>SMTP Server User ID</td>
<td>Alphanumeric</td>
<td>An additional security identifier for the mail server, that if required by the mail server is typically a short unique name or location of the server.</td>
</tr>
<tr>
<td>SMTP Password</td>
<td>Alphanumeric</td>
<td>Security code for the SMTP Server.</td>
</tr>
<tr>
<td>Retype SMTP Password</td>
<td>Alphanumeric</td>
<td>After the SMTP Password is entered above, an exactly matching entry must be made here to validate that password</td>
</tr>
<tr>
<td>Update (button)</td>
<td></td>
<td>Click on this button after changes have been made to the SMTP Server’s configuration before the change take effect.</td>
</tr>
<tr>
<td><strong>Time Configuration Fields</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Server URL</td>
<td>Location of time-tracking computer that supports SMTP. This server is the functional substitute for a real-time clock in the MultiAccess.</td>
<td></td>
</tr>
<tr>
<td>Add Time Server URL</td>
<td>Used to add a user-supplied time server.</td>
<td></td>
</tr>
<tr>
<td>Request Interval</td>
<td>This value (to be set by user) indicates how often the MultiAccess will update its clock from the Time Server.</td>
<td></td>
</tr>
<tr>
<td>Time Zone</td>
<td>Indicates the time zone in which the MultiAccess is located.</td>
<td></td>
</tr>
<tr>
<td>Date Format</td>
<td>Click on the down arrow to select the date format.</td>
<td></td>
</tr>
<tr>
<td>Time Format</td>
<td>Click on the down arrow to select the time format.</td>
<td></td>
</tr>
<tr>
<td>Update (button)</td>
<td>Click on this button to make changes to Time Configuration settings take effect.</td>
<td></td>
</tr>
<tr>
<td>Reset (button)</td>
<td>Soft reset of the software.</td>
<td></td>
</tr>
</tbody>
</table>
Local Users Data Base Screen

The administrator builds the Local Users data base defining the Name field, recording the User ID, Password entries, and callback method. The administrator account has both administration of the MA100-1M and dial-in and dial-out rights. The user accounts have dial-in and dial-out rights to use the modem. The remote user enters their user ID and password at the beginning of the dial-in session.

<table>
<thead>
<tr>
<th>Name</th>
<th>User ID</th>
<th>Password</th>
<th>Confirm Password</th>
<th>Callback Method</th>
<th>Callback #</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gerald O'Malley</td>
<td>7800</td>
<td></td>
<td>Admin specified</td>
<td>783-717-5555</td>
<td></td>
<td>update</td>
</tr>
<tr>
<td>Dee Ann Reel</td>
<td>765</td>
<td></td>
<td>Admin specified</td>
<td>783-717-5528</td>
<td></td>
<td>delete</td>
</tr>
<tr>
<td>Paul A. Bischke</td>
<td>780</td>
<td></td>
<td>User specified</td>
<td></td>
<td></td>
<td>delete</td>
</tr>
</tbody>
</table>

Local Users Field Definitions

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>21 Alphanumeric characters max</td>
<td>The Name field is a unique identifier that is used for ease of administration and is not used for authentication. For each user entry, this column shows the user’s name as you entered it.</td>
</tr>
<tr>
<td>User ID</td>
<td>21 Alphanumeric Characters max</td>
<td>The administrator enters the credentials, user ID, that the remote user is going to enter at his/her login prompt.</td>
</tr>
<tr>
<td>Password</td>
<td>21 Alphanumeric characters max</td>
<td>The administrator enters the credentials, password, that the remote user is going to enter at his/her login prompt.</td>
</tr>
<tr>
<td>Confirm Password</td>
<td>Alphanumeric</td>
<td>The confirm password is the identical password that you just entered in the Password window.</td>
</tr>
<tr>
<td>Callback</td>
<td>Disabled, User specified, Admin specified</td>
<td>User specified allows a remote user to enter a callback telephone number during a dial-in session and be able to change this number at any time. Admin specified allows a fixed telephone number to be entered that is associated with a remote location.</td>
</tr>
<tr>
<td>Callback #</td>
<td>Any printable character</td>
<td>This is the telephone number that the MultiAccess uses to call the remote user. This telephone number can be up to 39 digits.</td>
</tr>
<tr>
<td>Function – Update (button)</td>
<td>Click the Update button to after you have changed a user’s record.</td>
<td></td>
</tr>
<tr>
<td>Function – Delete (button)</td>
<td>Click the Delete button to remove a user record. Be aware that the removal of the user record is not confirmed.</td>
<td></td>
</tr>
<tr>
<td>Function – Add (button)</td>
<td>Click the Add button when you have entered a new user into the Local Users data base.</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 4: Software

Modem Setup

The Modem Setup screen defines the Modem Sharing behavior and general modem parameters, Country Code and number of rings before auto answer.

Prior to software release 1.03, the ports were configured for either RAS or modem sharing, for which they were then dedicated to just that role. Now, with software release 1.03, the ports can be configured for both roles, alleviating the need for administrator intervention when either role is desired.

The TCP port number to access the modem is 7000. The Modem Sharing method can be with or without an authentication process. Modem Sharing with authentication means a login prompt will be issued into the socket, to the user, when it is opened. Who, what, opens the socket must provide the appropriate credentials before access is given to the modem. The data base of user’s names and passwords the MultiAccess will check against can be one of two choices. A local data base, defined within the MultiAccess, or a Radius data base, defined in a Radius server, external to the MultiAccess.

The type of Telnet connection, mode, can be “Raw” or not Raw. A Raw Telnet connection is one that does not respond to or use Telnet and RFC 2217 escape sequences, flags. When Raw is not used, packets of FF will not be interpreted as escape flags. The escape routine includes a process of removing and replacing escape flags and subsequent characters normally intended for command and control function between Telnet hosts, RFC 2217 com port control via Telnet.

Modem Setup Screen Field Definitions

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modem Sharing</td>
<td>Modem Sharing with no, local, or radius Authentication, and Modem Sharing- Raw Mode with no, local or radius Authentication</td>
<td>The type of PPP session is standard PAP authentication with IP as the network protocol. No Authentication – Immediate access is granted to the modem. Local Authentication – A valid set of credentials, defined in the Local User data base, is required before access is granted. Radius Authentication – A valid set of credentials, defined in the Radius User data base, is required before access is granted. Raw is the type of telnet socket used to access the shared modem.</td>
</tr>
<tr>
<td>Country Code</td>
<td>Alphabatical</td>
<td>The Country Code configures the modem for the country that it is operating in.</td>
</tr>
<tr>
<td>Answer On</td>
<td>Numeric</td>
<td>The number of rings before the maodem answers is defaulted to two rings. You can change the number of rings from zero to 255 rings.</td>
</tr>
<tr>
<td>Update (button)</td>
<td></td>
<td>Click this button to update the configuration.</td>
</tr>
</tbody>
</table>
Chapter 4: Software

Authentication Screen

If the authentication method is Radius, then the IP address of the Radius server and Radius Accounting Server have to be entered and the user credentials are handled by the Radius server.

If the authentication method is local, the Local User Database defines the user credentials.

For RAS calls, dial-in PPP, a second static IP address is needed in the Remote Host Address field. This address is for the dial-in user, PPP peer. This address needs to be on the same subnet, network number, as that of the MultiAccess.

---

### Authentication Screen Field Definitions

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authentication Setup Fields</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authentication Type</td>
<td>local or radius</td>
<td>Local Authentication refers to the Local User database on the MultiAccess. Radius is a network specific protocol used to communicate authentication requests between the authentication server and Radius client. User credentials are stored within the Radius server. The MultiAccess is a Radius client.</td>
</tr>
<tr>
<td>Remote Host Address</td>
<td>n.n.n.n</td>
<td>This is the IP address the MultiAccess will assign to the remote node, PPP client, if one is not dictated by the Radius server which is included in the authentication accept packet issued by the Radius server. This address should be on the same network number as that of the MultiAccess.</td>
</tr>
<tr>
<td><strong>Radius Client Setup Fields</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RADIUS Server Address 1</td>
<td>n.n.n.n</td>
<td>IP address of the Radius Server providing remote user verification.</td>
</tr>
<tr>
<td>Port</td>
<td>numeric</td>
<td>The UDP port number (usually 1812) is used to communicate with the Radius Server. The Radius server has to listen on the same set of UDP ports that the Radius server, MultiAccess is using.</td>
</tr>
<tr>
<td>RADIUS Accounting Address 1</td>
<td>n.n.n.n</td>
<td>IP address of the Radius Accounting host. Radius accounting is a process that starts after successful Radius authentication. The MultiAccess sends an accounting start packet to the accounting server. When the user disconnects, the MultiAccess sends an accounting stop packet to the accounting server. Radius accounting summaries the time and date, duration, POTS port connected and IP address given to the user for that call. Radius accounting does not track the amount or type of data or places the user has been.</td>
</tr>
<tr>
<td>Port</td>
<td>Numeric</td>
<td>The UDP port number (usually 1813) is used to communicate with the Radius Accounting host. The host has to listen on the same set of UDP ports that the Radius client, MultiAccess, is using.</td>
</tr>
<tr>
<td>Secret</td>
<td>Alpha-numeric</td>
<td>The secret is used by the Radius Server to encrypt and by the Radius Client to unencrypt user passwords during exchanges of Radius authentication packets. The client secret has to be identical to the one used by the Radius server. MultiAccess implements MD5 encryption.</td>
</tr>
</tbody>
</table>
Chapter 5 – Troubleshooting

What if I can’t see the web page for my MultiAccess?

REMEDY: Is the PWR LED on the MultiAccess unit blinking? If not, then the unit is either malfunctioning or not turned on. If the PWR LED is flashing as a heart beat, then verify that the Admin PC is actually on the same subnet as the MultiAccess and that it can be “pinged.”

Launch a Command Prompt.
(In WinNT, go to Start | Programs | Command Prompt.
In WinXP, go to Start | All Programs | Accessories | Command Prompt.
In Win2000, go to Start | Programs | Accessories | Command Prompt.)

Type `ipconfig` to verify that the Admin PC’s IP address is in the same network as the MultiAccess’s IP address.

Then type `ping 192.168.2.1` and press Return.
If the MultiAccess unit does reply to the ping and you are still unable to view the MultiAccess web page, then call Multi-Tech Tech Support for more assistance (1-800-972-2439).

What if I don’t get an email when I set the mail server address?

This pertains to the procedure “Setting Up the Mail Server.”

The email may have failed due to one of three causes:
(A) the name server is irresolvable,
(B) the mail server cannot be contacted; or
© the client PC running the mail software cannot connect to the mail server.

CAUSE A: During transmission, the name server’s address could not be resolved (that is, the MultiAccess unit could not contact your name server).

RESPONSE A: Contact the MultiAccess unit using telnet and try to ping the name server.

telnet 192.168.x.x
user: admin
password: admin
# ping 192.168.y.y (where this is the address of the name server)
If the name server ping fails, you must determine why it failed.

The name server may not be contact-able because it is on a different subnet. The name server ping could also fail because the default gateway has been set incorrectly.
If the name server ping succeeds, then try to ping the mail server using its domain name.
# ping mail.ourcompany.com
If pinging the mail server by its domain name fails, then try pinging it by using its IP address (if this can be determined). If you succeed in pinging the mail server by its IP address but yet it cannot be pinged via its domain name, then the name server is not functioning correctly.
If the mail server can be pinged neither by its domain name nor by its IP address, then consider item B below.

CAUSE B: The mail server is not running or cannot be contacted from the MultiAccess unit.

RESPONSE B: Verify that the mail server is running by sending an email to yourself using your email software.
If you cannot send an email to yourself using your email software, then the mail server is not running and you should find out why.
If you can send an email to yourself using the email software, then there is a problem between your mail server and the MultiAccess unit. Call Multi-Tech Tech Support (1-800-972-2439).
CAUSE C: The client PC running the mail software cannot connect to the mail server.

RESPONSE C: If you, as a client, cannot send yourself an email, then contact your administrator; there may be a problem with your mail server.

If the Radius server shows the auth request was rejected?
CAUSE: The shared secret is wrong (case sensitive), the user is giving the wrong password, or the user doesn’t have appropriate rights.

If the Radius server doesn’t see the auth request?
CAUSE: The MultiAccess was not added to the clients file within the Radius server,
the Radius client is not set to the same set of UDP ports as the Radius server,
the Radius client is pointing to the wrong Radius server/IP address, or
there is a network problem blocking or dropping the request, Radius Protocol uses UDP to communicate.

RESPONSE: When the auth request is not seen by the Radius server, eventually the Radius client will report a “Radius Timeout” error, no response from the Radius server, and disconnect the user.

The MultiAccess can not tell which application, on the workstation, is opening the TCP port/socket.

Redirectors, telnet clients, and proprietary programs all appear the same to the MultiAccess because they all need to use/follow TCP/IP to get to the modem in the MultiAccess.

RESPONSE: Telnet to the modem in the MultiAccess and issue at commands, try to dial out. If it works, then the redirector is configured wrong, or the user application is configured wrong.

When the MultiAccess is configured for Modem Sharing with Radius Authentication, the user rights defined in the Radius server are not set correctly.
CAUSE: The Service Type Attribute in the Radius server configuration is not set to “Outbound”. 

Appendix A – Device Manager Utility

The Device Manager utility is used to synchronize phonebooks/local user databases, backup and restore a configuration, and update firmware in a MultiAccess ACS unit and its accompanying POTS modem. The Device Manager utility can manage multiple MultiAccess ACS units on the same network and on other networks as long as the manager has access to that network.

The process of installing the Device Manager utility is explained in the illustration below.

Insert MultiAccess ACS product CD. Installation wizard starts automatically.

Click Device Manager.

Accept default or choose other directory location. Click Next.

Click Next.

Click Install.

Click Finish.
Adding a Device to the Manager

In order for the Device Manager to recognize a MultiAccess ACS unit, the MA100-1M must be added to the manager. The Device Manager can manage multiple MA100-1M as long as the Device Manager has access to that network.

1. To launch the Device Manager program from the Windows desktop, go to Start | Programs | Multi-Tech Device Manager | Multi-Tech Device Manager. The Device Manager main screen will appear.

2. To add a MultiAccess ACS to the Manager, click Edit menu and select Add Device. When the Add Device Address screen appears, click on the Select Server down arrow and select MultiAccess ACS.

3. In the Enter Address window, enter the IP address for the unit you are adding.

4. In the Username and Password windows, enter the administrator's username and password for the unit you are adding.

5. Click OK when you are finished.

6. The Device Manager screen appears with the added Device.
Set Local User Sharing

Local user sharing must be set up per unit before local user data bases can be synchronized. When MultiAccess ACS local users are synchronized, all data bases contain the same user credentials except for the administrator accounts. One MultiAccess ACS unit (the **Primary** unit) holds the master list that is transmitted (using the **Synchronize Phonebooks/Local Users** command) to other MultiAccess ACS units on the network (**Copy** units). MultiAccess ACS units can operate on the same network, but have independent local user data bases, in which case they are designated **Independent**.

*Designating one MultiAccess ACS as the master local user data base.* In the main **Device Manager** screen, right-click on the unit to be designated as master, scroll to **set local user sharing**, and select **Primary**.

*Designating all other MultiAccess ACS units participating in local user sharing as **Copy** units.* In the main **Device Manager** screen, right-click on each unit to share the master local user data base, and select **Copy**.

*Designating a MultiAccess ACS as independent.* In the main **Device Manager** screen, right-click on the unit to be designated as master, scroll to **set local user sharing**, and select **Independent**.
Synchronize Phonebooks/Local Users

When MultiAccess ACS Local Users data bases are synchronized, all non-administrative listings match. One MultiAccess ACS unit (primary unit) holds the master data base that is transmitted to other remote units on the network (copy units). MultiAccess ACS units can operate on the network, but have independent Local Users, in which case they are designated as Independent. Independent units are ignored during synchronization.

1. **Invoking synchronization.** Click on the **Edit** menu and select **Synchronize Phonebooks/local users**.

2. The **Synchronize Phone Books** screen will appear along with a series of transient screens (denoting tftp data transfers) and confirmation screens.

3. After the master local users data is transferred to the first **Copy** MultiAccess ACS unit and that unit has been rebooted, the **Device Manager** will automatically begin synchronizing the additional **Copy** MultiAccess ACS unit on the network (if any) until all have been synchronized.
Updating Firmware

Over time, new versions of MultiAccess ACS firmware will be issued. When these newer versions become available, you will want to secure the firmware files (typically by downloading them from the MultiTech web site) and install them on the MultiAccess ACS.

There are two parts to a full firmware update:

(a) Updating POTS Modem 1 firmware (with file name of the form `dwqg<x><y>.hex`; where `x` is a number and `y` is a letter),

(b) Updating MultiAccess ACS firmware (with file name of the form `MA100-<x>-<yz>.bin`).

**NOTE:** You must have the update files on your computer before beginning this procedure. The latest version of these files will be available on the MultiTech web site. Put them in a directory on a computer connected to the network on which the MultiAccess ACS unit is running.

**NOTE:** Updating the MultiAccess ACS unit will take it out of operation for a few minutes (allow 10 minutes for each update if you already have the new firmware in a directory on the host computer). Do the update at a time that is not critical to your organization’s usage of the MultiAccess ACS service.

To update firmware, follow the steps shown below.

**MultiAccess ACS Modem Firmware Update**

1. Bring up the **Device Manager** Software main screen. In the **Device** column, identify the MultiAccess ACS unit on which the update is to be done. Be sure that the Status of that MultiAccess ACS unit is **idle** before continuing. (You cannot update the MultiAccess ACS while it is handling a call). Select that MultiAccess ACS unit and right-click on it. In the menu that appears, select **Update**.

2. The **Update MultiAccess ACS N.N.N.N** screen will appear. The current firmware versions for the MultiAccess ACS’s POTS Modem 1 will be listed in the main window.
In the bottom (and largest) pane of the **Update MultiAccess ACS n.n.n.n** window, read the list and write down the version of firmware currently in use for the POTS modem. Compare the version with the update file that you plan to use. *Make sure that the file to be installed really does supersede the one currently installed.*

3. In the **MultiAccess ACS Update Select** field, select the POTS Modem 1 to update.

4. Browse to the location of the most recent firmware file.

5. Click Start Update.

6. The **MultiAccess ACS – Confirm Update** screen will appear. Click OK.
7. The updating process will take as long as a minute. During this time, several messages will appear in the Update MultiAccess ACS N.N.N.N window. A transient TFTP screen may appear briefly. If the updating process has been successful, the final message line will say “Finished – The MultiAccess ACS is ready.”

8. The updating process is now complete. Click the “X” in the upper-right corner to return to the main Device Manager screen.
**MultiAccess ACS Firmware Update**

1. In the **Device** column of the **Device Manager** screen, identify the MultiAccess ACS unit on which the update is to be done. Be sure that the Status of that MultiAccess ACS unit is **idle** before continuing. (You cannot update the MultiAccess ACS while it is handling a call.) Select that MultiAccess ACS unit and right-click on it. In the menu that appears, select **Update**.

![Device Manager Screen](image)

2. The **Update MultiAccess ACS N.N.N.N** screen will appear. The current firmware versions for the MultiAccess ACS firmware and for POTS Modem 1 will be listed in the main window.

![Update Screen](image)

In the bottom (and largest) pane of the **Update MultiAccess ACS N.N.N.N** window, read the list and write down the version of firmware currently in use for the MultiAccess ACS. Compare the version with the update file that you plan to use. Make sure that the file to be installed really does supersede the one currently installed on the MultiAccess ACS.

3. In the **MultiAccess ACS Update Select** field, select “MultiAccess ACS firmware.”
4. Browse to the location of the most recent firmware file.

5. Click Start Update.

6. The **MultiAccess ACS – Confirm Update** screen will appear. Click **OK**.
7. The updating process will take as long as a minute. During this time, several messages will appear in the Update MultiAccess ACS N.N.N.N window. A transient TFTP screen may appear briefly. If the updating process has been successful, the final message line will say “Finished – The MultiAccess ACS is ready.”

8. Close the Update MultiAccess ACS N.N.N.N window. In the main Device Manager window, the updated version will be listed.

9. Repeat steps 1-8 for each MultiAccess ACS unit in the system.

NOTE: For proper operation of the MultiAccess ACS system, including the sharing of the Local Users data base data, the firmware version for all MultiAccess ACS units must be the same.

10. The updating process is now complete.
Appendix B – Regulatory Information

47 CFR Part 68 Telecom

1. This equipment complies with Part 68 of the 47 CFR rules and the requirements adopted by the ACTA. Located on this equipment is a label that contains, among other information, the registration number and ringer equivalence number (REN) for this equipment or a product identifier in the format:
   For current products is **US:AAAEQ##Txxxx**.
   For legacy products is **AU7USA-xxxxxx-xx-x**.
   If requested, this number must be provided to the telephone company.

2. A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable 47 CFR Part 68 rules and requirements adopted by the ACTA. It’s designed to be connected to a compatible modular jack that is also compliant.

3. The ringer equivalence number (REN) is used to determine the number of Devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the Devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of Devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ##Txxxx. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

4. If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn’t practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

5. The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

6. If trouble is experienced with this equipment, please contact Multi-Tech Systems, Inc. at the address shown below for details of how to have the repairs made. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

7. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

8. No repairs are to be made by you. Repairs are to be made only by Multi-Tech Systems or its licensees. Unauthorized repairs void registration and warranty.

9. If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this equipment does not disable your alarm equipment.
   If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

10. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

11. This equipment is hearing aid compatible.
12. Manufacturing Information:

Manufacturer: Multi-Tech Systems, Inc.
Trade Name: MultiAccess ACS
Model Number: MA100-1M
Registration No: AU7USA-25814-M5-E
Ringer Equivalence: 0.3B
Modular Jack (USOC): RJ11C or RJ11W (single line)
Service Center in USA: Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, MN 55112 U.S.A.
(763) 785-3500
(763) 785-9874 Fax

47 CFR Part 15 Regulation

This equipment has been tested and found to comply with the limits for a Class B digital Device, pursuant to 47 CFR Part 15 regulations. The stated limits in this regulation are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Plug the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This Device complies with Part 15 of the CFR 47 rules. Operation of this Device is subject to the following conditions:

1. This Device may not cause harmful interference, and
2. This Device must accept any interference that may cause undesired operation.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

Fax Branding Statement

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic Device, including fax machines, to send any message unless such message clearly contains the following information:

- Date and time the message is sent
- Identification of the business or other entity, or other individual sending the message
- Telephone number of the sending machine or such business, other entity, or individual

This information is to appear in a margin at the top or bottom of each transmitted page or on the first page of the transmission. (Adding this information in the margin is referred to as fax branding).

Any number of fax software packages can be used with this product. Refer to the fax software manual for setup details. Typically, the fax branding information must be entered via the configuration menu of the software.
Canadian Limitations Notice

Notice: The ringer equivalence number (REN) assigned to each terminal Device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of Devices subject only to the requirement that the sum of the ringer equivalence numbers of all the Devices does not exceed 5.

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Industry Canada label does not guarantee the equipment will operate to the user’s satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment or equipment malfunctions may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le materiel brouilleur.

Safety and EMC Product Approvals

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EMC, Safety, and Directive Compliance

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:


and


And

Appendix C – Waste Electrical and Electronic Equipment (WEEE) Statement

July, 2005

The WEEE directive places an obligation on EU-based manufacturers, distributors, retailers and importers to take-back electronics products at the end of their useful life. A sister Directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all Multi-Tech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union
The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user’s responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.
### 依照中国标准的有毒有害物质信息

根据中华人民共和国信息产业部 (MII) 制定的电子信息产品 (EIP) 标准－中华人民共和国《电子信息产品污染控制管理办法》（第 39 号），也称作中国 RoHS，下表列出了 Multi-Tech Systems Inc. 产品中可能含有的有毒物质 (TS) 或有害物质 (HS) 的名称及含量水平方面的信息。

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* 表示所有使用类似材料的设备中有害/有毒物质的含量水平高于 SJ/Txxx-2006 限量要求。
0 表示不含该物质或者该物质的含量水平在上述限量要求之内。
Appendix E – MCSI2000 Parameters

Setting Up MCSI2000 Com Port Redirector

Add one MCSI2000 com port to your workstation. Reboot the workstation. The properties of the MCSI2000 com port should be:

- Connect Time = 0
- Direct (Not MAG)
- Use Line Defaults Yes
- Server IP address is that of the MultiAccess
- Protocol Telnet
- Port Number 7000
- Authentication No.

For further details on how install and operate MCSI200, refer to the MCSI For Windows 2000 and XP Software Installation Guide on your product CD.
Appendix F - Modem AT Commands

AT Commands

Command: AT Attention Code
Values: N/A
Description: The attention code precedes all command lines except A/, A: and escape sequences.

Command: ENTER Key
Values: N/A
Description: Press the ENTER (RETURN) key to execute most commands.

Command: A Answer
Values: N/A
Description: Answer call before final ring.

Command: A/ Repeat Last Command
Values: N/A
Description: Repeat the last command string. Do not precede this command with AT. Do not press ENTER to execute.

Command: Bn Communication Standard Setting
Values: \(n = 0^{-3}, 15, 16\)
Default: 0 and 15
Description:
- B0 Select ITU-T V.22 mode when modem is at 1200 bps.
- B1 Select Bell 212A when modem is at 1200 bps.
- B2 Deselect V.23 reverse channel (same as B3).
- B3 Deselect V.23 reverse channel (same as B2).
- B15 Select V.21 when the modem is at 300 bps.
- B16 Select Bell 103J when the modem is at 300 bps.
### Command: Ds  Dial

**Values:**

- `s`: dial string (phone number and dial modifiers)

**Default:**

- none

**Description:**

Dial telephone number `s`, where `s` may up to 40 characters long and include the 0–9, *, #, , B, C, and D characters, and the L, P, T, V, W, S, comma (,), semicolon (;), i, @, ^ and $ dial string modifiers.

**Dial string modifiers:**

- L: Redial last number. (Must be placed immediately after **ATD**.)
- P: Pulse-dial following numbers in command.
- T: Tone-dial following numbers in command (default).
- V: Switch to speakerphone mode and dial the following number. Use **ATH** command to hang up.
- W: Wait for a new dial tone before continuing to dial. (X2, X4, X5, X6, or X7 must be selected.)
- ,: Pause during dialing for time set in register S8.
- ;: Return to command mode after dialing. (Place at end of dial string.)
- !: Hook flash. Causes the modem to go on-hook for one-half second, then off-hook again.
- @: Wait for quiet answer. Causes modem to wait for a ringback, then 5 seconds of silence, before processing next part of command. If silence is not detected, the modem returns a NO ANSWER code.
- ^: Disable data calling tone transmission.
- $: Detect AT&T call card “bong” tone. The character should follow the phone number and precede the user’s call card number: **ATDT1028806127853500$123456789**

### Command: DS=y  Dial Stored Telephone Number

**Values:**

- `n`: 0–2 (0–1 for SMI-Parallel {internal})

**Default:**

- none

**Description:**

Dial a number previously stored in directory number `y` by the &Zy=x command. Example: **ATDS=2**

### Command: En  Echo Command Mode Characters

**Values:**

- `n`: 0 or 1

**Default:**

- 1

**Description:**

- E0: Do not echo keyboard input to the terminal.
- E1: Do echo keyboard input to the terminal.

### Command: Fn  Echo Online Data Characters

**Values:**

- `n`: 1

**Default:**

- 1

**Description:**

- F0: Enable online data character echo. (Not supported.)
- F1: Disable online data character echo (included for backward compatibility with some software).

### Command: Hn  Hook Control

**Values:**

- `n`: 0 or 1

**Default:**

- 0

**Description:**

- H0: Go on-hook (hang up).
- H1: Go off-hook (make the phone line busy).
Command:  **In**  \* Information Request  
Values: \( n = 0–5, 9, 11 \)  
Default: None  
Description:  
I0  Display default speed and controller firmware version.  
I1  Calculate and display ROM checksum (e.g., 12AB).  
I2  Check ROM and verify the checksum, displaying OK or ERROR.  
I3  Display default speed and controller firmware version.  
I4  Display firmware version for data pump (e.g., 94).  
I5  Display the board ID: software version, hardware version, and country/region ID  
I9  Display the country/regional code (e.g., NA Ver. 1).  
I11 Display diagnostic information for the last modem connection, such as DSP and firmware version, link type, line speed, serial speed, type of error correction/data compression, number of past retraining, etc.

Command:  **Mn**  \* Monitor Speaker Mode  
Values: \( n = 0, 1, 2, \) or 3  
Default: 1  
Description:  
M0  Speaker always off.  
M1  Speaker on until carrier signal detected.  
M2  Speaker always on when modem is off-hook.  
M3  Speaker on until carrier is detected, except while dialing.

Command:  **Nn**  \* Modulation Handshake  
Values: \( n = 0 \) or 1  
Default: 1  
Description:  
N0  Modern performs handshake only at communication standard specified by S37 and the B command.  
N1  Modern begins handshake at communication standard specified by S37 and the B command. During handshake, fallback to a lower speed can occur.

Command:  **On**  \* Return Online to Data Mode  
Values: \( 0, 1, 3 \)  
Default: None  
Description:  
O0  Exit online command mode and return to data mode (see +++AT<CR> escape sequence).  
O1  Issue a retrain and return to online data mode.  
O3  Issue a rate renegotiation and return to data mode.

Command:  **P**  \* Pulse Dialing  
Values: P, T  
Default: T  
Description:  Configures the modem for pulse (non-touch-tone) dialing. Dialed digits are pulsed until a T command or dial modifier is received.

Command:  **Qn**  \* Result Codes Enable/Disable  
Values: \( n = 0 \) or 1  
Default: 0  
Description:  
Q0  Enable result codes.  
Q1  Disable result codes.  
Q2  Returns an OK for backward compatibility with some software.
Appendix F – Modem AT Commands

Command: \texttt{Sr=}\text{n} \hspace{1cm} \text{Set Register Value}

Values: \texttt{r} = S-register number; \text{n} varies
Default: None
Description: Set value of register \texttt{Sr} to value of \text{n}, where \text{n} is entered in decimal format (e.g., \texttt{S0=1}).

Command: \texttt{Sr?} \hspace{1cm} \text{Read Register Value}

Values: \texttt{r} = S-register number
Default: None
Description: Read value of register \texttt{Sr} and display it in 3-digit decimal form (e.g., \texttt{S2?} gives the response 043).

Command: \texttt{T} \hspace{1cm} \text{Tone Dialing}

Values: \texttt{P, T}
Default: \text{T}
Description: Configures the modem for DTMF (touch-tone) dialing. Dialed digits are tone dialed until a \texttt{P} command or dial modifier is received.

Command: \texttt{Vn} \hspace{1cm} \text{Result Code Format}

Values: \text{n} = 0 or 1
Default: 1
Description: \text{V0} Displays result codes as digits (terse response).
\text{V1} Displays result codes as words (verbose response).

Command: \texttt{Wn} \hspace{1cm} \text{Result Code Options}

Values: \text{n} = 0, 1, or 2
Default: 2
Description: \text{W0} CONNECT result code reports serial port speed, disables protocol result codes.
\text{W1} CONNECT result code reports serial port speed, enables protocol result codes.
\text{W2} CONNECT result code reports line speed, enables protocol result codes.

Command: \texttt{Xn} \hspace{1cm} \text{Result Code Selection}

Values: \text{n} = 0–7
Default: 4
Description: \text{X0} Basic result codes (\text{CONNECT}); does not look for dial tone or busy signal.
\text{X1} Extended result codes (\text{CONNECT 46000 V42bis}); does not look for dial tone or busy signal.
\text{X2} Extended result codes with \text{NO DIALTONE}; does not look for busy signal.
\text{X3} Extended result codes with \text{BUSY}; does not look for dial tone.
\text{X4} Extended result codes with \text{NO DIALTONE} and \text{BUSY}.
\text{X5} Extended result codes with \text{NO DIALTONE} and \text{BUSY}.
\text{X6} Extended result codes with \text{NO DIALTONE} and \text{BUSY}.
\text{X7} Basic result codes with \text{NO DIALTONE} and \text{BUSY}.

Command: \texttt{Zn} \hspace{1cm} \text{Modem Reset}

Values: \text{n} = 0 or 1
Default: None
Description: \text{Z0} Reset modem to profile saved by the last &\text{W} command.
\text{Z1} Same as \text{Z0}.
Appendix F – Modem AT Commands

Command: &C n
Data Carrier Detect (DCD) Control
Values: n = 0, 1, 2
Default: 1
Description:
&C0 Forces the DCD circuit to be always ON.
&C1 DCD goes ON when the remote modem’s carrier signal is detected, and goes OFF when the carrier signal is not detected.
&C2 DCD turns OFF upon disconnect for time set by S18. It then goes high again (for some PBX phone systems).

Command: &D n
Data Terminal Ready (DTR) Control
Values: n = 0, 1, 2, or 3
Default: 2
Description:
&D0 Modem ignores true status of DTR signal and responds as if it is always on.
&D1 If DTR drops while in online data mode, the modem enters command mode, issues an OK, and remains connected.
&D2 If DTR drops while in online data mode, the modem hangs up. If the signal is not present, the modem will not answer or dial.
&D3 If DTR drops, modem hangs up and resets as if ATZ command were issued.

Command: &E n
XON/XOFF Pacing Control
Values: n = 12 or 13
Default: 12
Description:
&E12 Disables XON/XOFF pacing.
&E13 Enables XON/XOFF pacing.

Command: &F n
Load Factory Settings
Values: n = 0
Default: None
Description:
&F0 Load factory settings as active configuration.

Note: See also the Z command.

Command: &G n
V.22bis Guard Tone Control
Values: n = 0, 1, or 2
Default: 0
Description:
&G0 Disable guard tone.
&G1 Set guard tone to 550 Hz.
&G2 Set guard tone to 1800 Hz.

Note: The &G command is not used in North America.

Command: &K n
Flow Control Selection
Values: n = 0, 3, or 4
Default: 3
Description:
&K0 Disable flow control.
&K3 Enable CTS/RTS hardware flow control.
&K4 Enable XON/XOFF software flow control.
Command: &Ln  Leased Line Operation
Values: \( n = 0, 1, \text{ or } 2 \)
Defaults: 0
Description:
\&L0 The modem is set for standard dial-up operation.
\&L1 The modem is set for leased line operation in originate mode.
\&L2 The modem is set for leased line operation in answer mode.

**Note:** For \&L1 and \&L2, there is a 30-second window between power up and the starting of the leased line handshake. During this time, you can turn off the command, if desired.

Command: &Pn  Pulse Dial Make-to-Break Ratio Selection
Values: \( n = 0, 1, \text{ or } 2 \)
Default: 0
Description:
\&P0 60/40 make-to-break ratio
\&P1 67/33 make-to-break ratio
\&P2 20 pulses per second

**Note:** The \&P2 command is available only if the country/regional code is set to Japan.

Command: &Qn  Asynchronous Communications Mode
Values: \( n = 0, 5, 6, 8, \text{ or } 9 \)
Default: 5
Description:
\&Q0 Asynchronous with data buffering. Same as \N0.
\&Q5 Error control with data buffering. Same as \N3.
\&Q6 Asynchronous with data buffering. Same as \N0.
\&Q8 MNP error control mode. If MNP error control is not established, the modem falls back according to the setting in S36.
\&Q9 V.42 or MNP error control mode. If neither error control is established, the modem falls back according to the setting in S36.

Command: &Sn  Data Set Ready (DSR) Control
Values: \( n = 0 \text{ or } 1 \)
Default: 0
Description:
\&S0 DSR is always ON.
\&S1 DSR goes ON only during a connection.

Command: &Tn  Loopback Test (V.54 Test) Commands
Values: \( n = 0, 1, 3, 6 \)
Default: None
Description:
The modem can perform selected test and diagnostic functions. A test can be run only when the modem is operating in non-error-correction mode (normal or direct mode). For tests 3 and 6, a connection between the two modems must be established. To terminate a test in progress, the escape sequence (+++AT) must be entered.
\&T0 Stops any test in progress.
\&T1 Starts a local analog loopback, V.54 Loop 3, test. If a connection exists when this command is issued, the modem hangs up. When the test starts, a CONNECT message is displayed.
\&T3 Starts local digital loopback, V.54 Loop 2, test. If no connection exists, ERROR is returned.
\&T6 Initiates a remote digital loopback, V.54 Loop 2, test without self-test. If no connection exists, ERROR is returned.

Command: &V  Display Current Settings
Values: N/A
Description:
Displays the active modem settings.
### Appendix F – Modem AT Commands

<table>
<thead>
<tr>
<th>Command: &amp;W(n)</th>
<th>Store Current Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values: (n = 0) or (1)</td>
<td></td>
</tr>
<tr>
<td>Default: (1)</td>
<td></td>
</tr>
<tr>
<td>Description: &amp;W0 Stores current modem settings in non-volatile memory and causes them to be loaded at power-on or following the ATZ command instead of the factory defaults. See &amp;F command. &amp;W1 Clears user default settings from non-volatile memory and causes the factory defaults to be loaded at power-on or following the ATZ command.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command: &amp;Zy=x</th>
<th>Store Dialing Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values: (y = 0)–(2) ((0)–(1)SMI-Parallel {internal}) (x = ) Dialing command</td>
<td></td>
</tr>
<tr>
<td>Default: None</td>
<td></td>
</tr>
<tr>
<td>Description: Stores dialing command (x) in memory location (y). Dial the stored number using the command ATDS(=y). See Also the #CBS command, a callback security command.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command: \A(n)</th>
<th>Select Maximum MNP Block Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values: (n = 0, 1, 2,) or (3)</td>
<td></td>
</tr>
<tr>
<td>Default: (3)</td>
<td></td>
</tr>
<tr>
<td>Description: \A0 64-character maximum \A1 128-character maximum \A2 192-character maximum \A3 256-character maximum</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command: \B(n)</th>
<th>Transmit Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values: (n = 0)–(9) in (100) ms units</td>
<td></td>
</tr>
<tr>
<td>Default: (3)</td>
<td></td>
</tr>
<tr>
<td>Description: In non-error-correction mode only, sends a break signal of the specified length to a remote modem. Works in conjunction with the (\mathbf{K}) command.</td>
<td></td>
</tr>
</tbody>
</table>
Command: \Kn Break Control
Values: \n = 0–5
Default: 5
Description: Controls the modem's response to a break received from: computer, remote modem, or \B command. Response is different for each of three different states.

Data mode. Modem receives the break from the computer:
\K0 Enter online command mode, no break sent to the remote modem.
\K1 Clear data buffers and send break to the remote modem.
\K2 Same as \K0.
\K3 Send break immediately to the remote modem.
\K4 Same as \K0.
\K5 Send break to the remote modem in sequence with the transmitted data.

Data mode. Modem receives the break from the remote modem:
\K0 Clear data buffers and send break to the computer.
\K1 Same as \K0.
\K2 Send break immediately to the computer.
\K3 Same as \K2.
\K4 Send break to the computer in sequence with the received data.
\K5 Same as \K4.

Online command mode. Modem receives a \Bn command from the computer:
\K0 Clear data buffers and send break to the computer.
\K1 Same as \K0.
\K2 Send break immediately to the remote modem.
\K3 Same as \K2.
\K4 Send break to the remote modem in sequence with the transmitted data.
\K5 Same as \K4.

Command: \Nn Error Correction Mode Selection
Values: \n = 0–5, or 7
Default: 3
Description: \N0 Non-error correction mode with data buffering (buffer mode; same as \&Q6).
\N1 Same as \N0.
\N2 MNP reliable mode. If the modem cannot make an MNP connection, it disconnects.
\N3 V.42/MNP auto-reliable mode. The modem attempts first to connect in V.42 error correction mode, then in MNP mode, and finally in non-error correction (buffer) mode with continued operation.
\N4 V.42 reliable mode. If the modem cannot make a V.42 connection, it disconnects.
\N5 V.42, MNP, or non-error correction (same as \N3).
\N7 V.42, MNP, or non-error correction (same as \N3).

Command: \Qn Flow Control Selection
Values: \n = 0, 1, or 3
Default: 3
Description: \Q0 Disable flow control (same as \&K0).
\Q1 XON/XOFF software flow control (same as \&K4).
\Q2 CTS-only flow control. Not supported.
\Q3 RTS/CTS hardware flow control (same as \&K3).

Command: \Tn Inactivity Timer
Values: \n = 0, 1–255
Default: 0
Description: Sets the time (in minutes) after the last character is sent or received that the modem waits before disconnecting. A value of zero disables the timer. Applies only in buffer mode.

Note: You can also set the inactivity timer by changing the value of \S30.

Command: \Wn Protocol Result Code
Values: \n = 0, 1, or 2
Default: 1
Description: \W0 Disables the appending of the protocol result code to the DCE speed.
\W1 Enables the appending of the protocol result code to the DCE speed.
\W2 Same as \W1.
Appendix F – Modem AT Commands

Command: \Xn XON/XOFF Pass-Through
Values: \X0: 0 or 1
Default: 0
Description: \X0: Modem responds to and discards XON/XOFF characters.
\X1: Modem responds to and passes XON/XOFF characters.
Note: This is also controlled via &E6 and &E7.

Command: -Cn Data Calling Tone
Values: -C0: 0 or 1
Default: 1
Description: -C0: Disable V.25 data calling tone to deny remote data/fax/voice discrimination.
-C1: Enable V.25 data calling tone to allow remote data/fax/voice discrimination.

Command: %A Adaptive Answer Result Code Enable
Values: %A0: 0 or 1
Default: 0
Description: The %A command controls whether the DATA or FAX result codes will be sent by the modem. The modem must be in fax mode for this command to work. Also, the modem must be set to +FAA=1, which enables the modem to distinguish between a fax and a data call. When these commands are enabled, the modem sends DATA to the computer when it detects data tones and FAX when it detects fax tones. These strings are used by some servers to select the appropriate communication program.
%A0: Disables adaptive answer result codes.
%A1: Enables adaptive answer result codes.

Command: %B View Numbers in Blacklist
Values: N/A
Description: If blacklisting is in effect, AT%B displays the numbers for which the last call attempted in the previous two hours failed. In countries that do not require blacklisting, the ERROR result code appears.

Command: %Cn Data Compression Control
Values: %C0: 0 or 1
Default: 1
Description: %C0: Disable V.42bis/MNP 5 data compression.
%C1: Enable V.42bis/MNP 5 data compression.

Command: %DCn AT Command Control
Values: %DC0: 0 or 1
Default: 0
Description: %DC0: The modem responds to AT commands.
%DC1: The modem ignores AT commands.
Note: The modem will respond to AT%DC for 10 seconds after power-up.

Command: %En Fallback and Fall Forward Control
Values: %E0: 0, 1, or 2
Default: 2
Description: %E0: Disable fallback and fall forward.
%E1: Enable fallback, disable fall forward.
%E2: Enable fallback and fall forward.

Command: %Hn Direct Connect Enable
Values: %H0: 0
Default: 0
Description: %H0: Sets callback security to normal operation.
%H1: All callback security calls will be direct connect regardless of whether the password or phone number has the - character.
### Command: %Rn  Cisco Configuration
Values: \( n = 0, 1 \)
Default: 0
Description: 
- \%R0: Disables Cisco configuration.
- \%R1: Sets \( E_0, Q_1, &D_0, \_N_0, \$SB9600 \), and \%S1 for operation with a Cisco router.

### Command: %Sn  Command Speed Response
Values: \( n = 0, 1 \)
Default: 0
Description: 
- \%S0: Sets modem to respond to AT commands at all normal speeds.
- \%S1: AT commands accepted at 115200 bps only. Commands at other speeds are ignored.

### Command: $Dn  DTR Dialing
Values: \( n = 0 \) or 1
Default: 0
Description: 
- \$D0: Disables DTR dialing.
- \$D1: Dials the number in memory location 0 when DTR goes high.

### Command: $EBn  Asynchronous Word Length
Values: \( n = 0 \) or 1
Default: 0
Description: 
- \$EB0: Enables 10-bit mode.
- \$EB1: Enables 11-bit mode.

### Command: $MBn  Online BPS Speed
Values: \( n = \text{speed in bits per second} \)
Default: 28,800
Description: 
- \$MB75: Selects CCITT V.23 mode
- \$MB300: Selects 300 bps on-line
- \$MB1200: Selects 1200 bps on-line
- \$MB2400: Selects 2400 bps on-line
- \$MB4800: Selects 4800 bps on-line
- \$MB9600: Selects 9600 bps on-line
- \$MB14400: Selects 14400 bps on-line
- \$MB19200: Selects 19200 bps on-line
- \$MB28800: Selects 28800 bps on-line
- \$MB33600: Selects 33600 bps on-line
- \$MB28800: Selects 28800 bps on-line
- \$MB38400: Selects 38400 bps on-line
- \$MB57600: Selects 57600 bps on-line
- \$MB115200: Selects 115200 bps on-line
- \$MB230400: Selects 230400 bps on-line

### Command: $RPn  Ring Priority vs. AT Command Priority
Values: \( n = 0 \) or 1
Default: 1
Description: 
- \$RP0: The AT command will have priority over the ring. S1 will be reset to 0 if an AT command is received. This command is storable to memory.
- \$RP1: The ring will have priority over the AT command. S1 will increment even if an AT command and ring are received together and the incoming call will be answered when S1 is equal to S0.

**Note:** SocketModems do not detect ring cadence of TelTone telephone line simulators as a valid ring.

### Command: $SBn  Serial Port Baud Rate
Values: \( n = \text{speed in bits per second} \)
Default: 57600
Description: 
- \$SB300: Sets serial port to 300 bps
- \$SB1200: Sets serial port to 1200 bps
- \$SB2400: Sets serial port to 2400 bps
- \$SB4800: Sets serial port to 4800 bps
- \$SB9600: Sets serial port to 9600 bps
- \$SB19200: Sets serial port to 19200 bps
- \$SB38400: Sets serial port to 38400 bps
- \$SB57600: Sets serial port to 57600 bps
- \$SB115200: Sets serial port to 115200 bps
- \$SB230400: Sets serial port to 230400 bps
## Command: `+VDR=x, y`

### Distinctive Ring Report

- **x = 0, 1** Distinctive Ring report control. See description.
- **y = 0–255** Minimum ring interval in 100 ms units. See description.

**Default:**

0, 0  

**Description:** Enables reporting of ring cadence information to the DTE and specifies the minimum ring cadence that will be reported.

The report format is one line per silence period and one line per ring period. The length of the silence period is in the form DROF=number in units of 100 ms<CR><LF>, and the length of the ring is in the form DRON=number in units of 100 ms<CR><LF>. The modem may produce a Ring event code after the DRON message if enabled by the y parameter. The y parameter must be set to a value equal to or smaller than the expected ring cadence in order to pass the report to the DTE.

- `+VDR=0, N/A` Disables Distinctive Ring cadence reporting.  
- `+VDR=1, 0` Enables Distinctive Ring cadence reporting. Other call progress result codes (including RING) are reported as normal.  
- `+VDR=1, >0` Enables Distinctive Ring cadence reporting. The RING result code is reported after the falling edge of the ring pulse (i.e., after the DRON report).  
- `+VDR=?` Displays the allowed values.  
- `+VDR?` Displays the current value.
### Command: `#CBAn`  
**Callback Attempts**  
**Values:**  
n = 1–255  
**Default:**  
4  
**Description:**  
Sets the number of callback attempts that are allowed after passwords have been exchanged between modems.

### Command: `#CBDn`  
**Callback Delay**  
**Values:**  
n = 0–255  
**Default:**  
15  
**Description:**  
Sets the length of time (in seconds) that the modem waits before calling back the remote modem.

### Command: `#CBF?`  
**Callback Failed Attempts Display**  
**Values:**  
N/A  
**Default:**  
N/A  
**Description:**  
Requests the number of failed callback passwords since reset or power-up. This number can be stored to nonvolatile memory using the `&W` command.

### Command: `#CBFR`  
**Callback Failed Attempts Reset**  
**Values:**  
N/A  
**Default:**  
N/A  
**Description:**  
Resets the number of failed callback passwords to 0. This does not reset the number stored in nonvolatile memory.

### Command: `#CBIn`  
**Local Callback Inactivity Timer**  
**Values:**  
n = 1–255  
**Default:**  
20  
**Description:**  
Sets the time (in minutes) that the modem waits for a command before forcing the user to enter the setup password again.

### Command: `#CBNy=x`  
**Store Callback Password**  
**Values:**  
y = 0–29  
x = password  
**Defaults:**  
None  
**Description:**  
Sets the callback security password for the y memory location. The password must have 6 to 10 characters, and cannot include the `+` or `-` characters.

### Command: `#CBPn`  
**Callback Parity**  
**Values:**  
n = 0, 1, or 2  
**Default:**  
0  
**Description:**  
Sets parity for the callback security messages.  
#CBP0 No parity.  
#CBP1 Odd parity.  
#CBP2 Even parity.
Appendix F – Modem AT Commands

**Command: #CBRy**  
**Callback Security Reset**  
Values:   
y = 0–29  
Default: None  
Description: Clears the password and phone number in the y memory location.

**Command: #CBSn**  
**Callback Enable/Disable**  
Values:   
n = 0, 1, 2, or 3  
Default: 0  
Description:  
#CBS0 Disables callback security.  
#CBS1 Enables local and remote callback security.  
#CBS2 Enables remote callback security only.  
#CBS3 Disables callback security until local hang-up or reset.

**Command: #Pn**  
**Set 11-bit Parity**  
Values:   
n = 0 or 1  
Default: 2  
Description:  
#P0 No parity.  
#P1 Odd parity.  
#P2 Even parity.

**Command: #Sx**  
**Enter Setup Password**  
Values:   
x= password (1–8 characters, case sensitive)  
Default: MTSMODEM  
Description: Enters the remote configuration setup password.

**Command: #S=x**  
**Store Setup Password**  
Values:   
x= password (1–8 characters, case sensitive)  
Default: MTSMODEM  
Description: Stores a new remote configuration setup password.
## Escape AT Commands

<table>
<thead>
<tr>
<th>Command:</th>
<th>+++AT&lt;CR&gt;</th>
<th>Escape Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values:</td>
<td>N/A</td>
<td>Puts the modem in command mode (and optionally issues a command) while remaining online. Type +++AT and up to six optional command characters; then press ENTER. Used mostly to issue the hang-up command: +++ATH&lt;CR&gt;.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>%%%ATMTSMODEM&lt;CR&gt;</th>
<th>Remote Configuration Escape Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values:</td>
<td>N/A</td>
<td>Initiated remote configuration mode while online with remote modem. The remote configuration escape character (%) is defined in register S13.</td>
</tr>
<tr>
<td>Description:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
V.92 Commands

Command: +MS=

Modulation Selection

Values: See description.

Defaults: See description.

Description: This extended-format command selects modulation, enables or disables automode, and specifies the highest downstream and upstream connection rates using one to four subparameters.

The command syntax is

+MS=[mod][,automode][,0][,max_rate][,0][,max_rx_rate]]<CR>

Subparameters that are not entered retain their current value. Commas separate optional subparameters, and must be inserted to skip a subparameter. Example: +MS=,0<CR> disables automode and keeps all other settings at their current values.

+MS=? Reports supported options in the format (list of supported mod values),(list of supported automode values),(0),(list of supported max_rate values),(0),(list of supported max_rx_rate values). Example: +MS: (BELL103, V21, BELL212A, V22, V22B, V23C, V32, V32B, V34, V90, V92), (0, 1), (0), (0-33600), (0), (0-56000)

+MS? Reports current options in the format mod, automode, 0, max_rate, 0, max_rx_rate.

Example: +MS: V92, 1, 0, 31200, 0, 56000.

Subparameters

mod

Specifies the preferred modulation (automode enabled) or the modulation to use in originating or answering a connection (automode disabled). The default is V92.

<table>
<thead>
<tr>
<th>mod</th>
<th>Modulation</th>
<th>Possible rates (bps)$^1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>V92</td>
<td>V92</td>
<td>56000, 54666, 53333, 52000, 50666, 49333, 48000, 46666, 45333, 44000, 42666, 41333, 40000, 38666, 37333, 36000, 34666, 33333, 32000, 30666, 29333, or 28000</td>
</tr>
<tr>
<td>V903</td>
<td>V.90</td>
<td>56000, 54666, 53333, 52000, 50666, 49333, 48000, 46666, 45333, 44000, 42666, 41333, 40000, 38666, 37333, 36000, 34666, 33333, 32000, 30666, 29333, or 28000</td>
</tr>
<tr>
<td>V34</td>
<td>V.34</td>
<td>33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400</td>
</tr>
<tr>
<td>V32B</td>
<td>V.32bis</td>
<td>14400, 12000, 9600, 7200, or 4800</td>
</tr>
<tr>
<td>V32</td>
<td>V.32</td>
<td>9600 or 4800</td>
</tr>
<tr>
<td>V22B</td>
<td>V.22bis</td>
<td>2400 or 1200</td>
</tr>
<tr>
<td>V22</td>
<td>V.22</td>
<td>1200</td>
</tr>
<tr>
<td>V23C</td>
<td>V.23</td>
<td>1200</td>
</tr>
<tr>
<td>V21</td>
<td>V.21</td>
<td>300</td>
</tr>
<tr>
<td>Bell212A</td>
<td>Bell 212A</td>
<td>1200</td>
</tr>
<tr>
<td>Bell103</td>
<td>Bell 103</td>
<td>300</td>
</tr>
</tbody>
</table>

Notes:
1. See optional <automode>, <max_rate>, and <max_RX_rate> subparameters.
2. Selects V.92 modulation as first priority. If a V.92 connection cannot be established, the modem attempts V.90, V.34, V.32bis, etc.
3. Selects V.90 modulation as first priority. If a V.90 connection cannot be established, the modem attempts V.34, V.32bis, etc.

automode

An optional numeric value that enables or disables automatic modulation negotiation using V.8 bis/V.8 or V.32 bis Annex A. Automode is disabled if values are specified for the max_rate and max_rx_rate parameters. The options are:

0 Disable automode
1 Enable automode (default)
**max_rate**  An optional number that specifies the highest rate at which the modem may establish an upstream (transmit) connection. The value is decimal coded in units of bps, for example, 33600 specifies the highest rate to be 33600 bps.

- **0** Maximum rate determined by the modulation selected in `mod` (default).

**300–33600** Maximum rate value limited by the modulation selected in `mod`. For valid `max_rate` values for each mod value, see the following table.

<table>
<thead>
<tr>
<th>mod value</th>
<th>Valid max_rate values (bps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V92, V90, V34</td>
<td>31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400</td>
</tr>
<tr>
<td>V32B</td>
<td>19200, 16800, 14400, 12000, 9600, 7200, 4800</td>
</tr>
<tr>
<td>V32</td>
<td>14400, 12000, 9600, 7200, 4800</td>
</tr>
<tr>
<td>V22B</td>
<td>2400</td>
</tr>
<tr>
<td>V22, V23C, Bell212A</td>
<td>1200</td>
</tr>
<tr>
<td>V21, Bell103</td>
<td>300</td>
</tr>
</tbody>
</table>

**max_rx_rate**  An optional number that specifies the highest rate at which the modem may establish a downstream (receive) connection. The value is decimal coded in units of bps, e.g., 28800 specifies the highest rate to be 28800 bps.

- **0** Maximum rate determined by the modulation selected in `mod` (default).

**300–56000** Maximum rate value limited by the modulation selected in `mod`. See “Possible rates” in the `mod` table.

**Command:**  `+PCW=n`  *Call Waiting Enable*
*Values:*  n = 0, 1, or 2  
*Default:*  2  
*Description:*  Controls the action to be taken upon detection of a call waiting tone in V.92 mode. Values specified by this command are not modified when an `AT&F` command is issued.

- `+PCW=0`  Toggles V.24 Circuit 125 and collects Caller ID if enabled by `+VCID`
- `+PCW=1`  Hangs up
- `+PCW=2`  Ignores V.92 call waiting
- `+PCW=?`  Displays the allowed values
- `+PCW?`  Displays the current value

**Command:**  `+PIG=n`  *PCM Upstream Ignore*
*Values:*  n = 0 or 1  
*Default:*  1  
*Description:*  Controls the use of PCM upstream during V.92 operation. PCM upstream allows faster upload speeds to a V.92 server.

- `+PIG=0`  Disables PCM upstream
- `+PIG=1`  Enables PCM upstream
- `+PIG=?`  Displays the allowed values
- `+PIG?`  Displays the current value

**Command:**  `+PMH=n`  *Modem on Hold Enable*
*Values:*  n = 0 or 1  
*Default:*  1  
*Description:*  Controls if modem on hold procedures are enabled during V.92 operation. Normally controlled by a modem on hold program. Values specified by this command are not modified when an `AT&F` command is issued.

- `+PMH=0`  Enables V.92 modem on hold
- `+PMH=1`  Disables V.92 modem on hold
- `+PMH=?`  Displays the allowed values
- `+PMH?`  Displays the current value
Appendix F – Modem AT Commands

Command: +PMHF  V.92 Modem Hook Flash
Values: N/A
Default: N/A
Description: Causes the DCE to go on-hook for a specified period of time, and then return off-hook for at least a specified period of time. The specified period of time is normally one-half second, but may be governed by national regulations.

Command: +PQC=n Quick Connect Control
Values: n = 0, 1, 2, or 3
Default: 3
Description: Controls V.92 shortened Phase 1 and Phase 2 startup procedures (Quick Connect).
When line conditions are stable, quick connect results in shortened connect times; however, significant fluctuation in line conditions from call to call can cause longer connect times; thus, it may be advisable to disable quick connect.
+PQC=0 Enables Short Phase 1 and Short Phase 2 (Quick Connect)
+PQC=1 Enables Short Phase 1
+PQC=2 Enables Short Phase 2
+PQC=3 Disables Short Phase 1 and Short Phase 2
+PQC=? Displays the allowed values
+PQC? Displays the current value

Command: +VCID=n Caller ID Selection
Values: n = 0, 1, or 2
Default: 0
Description: Enables Caller ID detection and configures the reporting and presentation of the Caller ID data that is detected after the first ring. The reported data includes the date and time of the call, the caller's name and number, and a message. Set S0=2.
+VCID=0 Disables Caller ID
+VCID=1 Enables Caller ID with formatted data
+VCID=2 Enables Caller ID with unformatted data
+VCID=? Displays the allowed values
+VCID? Displays the current value

Command: +VDR=x, y Distinctive Ring Report
Values: x = 0, 1 Distinctive Ring report control. See description.
y = 0–255 Minimum ring interval in 100 ms units. See description.
Default: 0, 0
Description: Enables reporting of ring cadence information to the DTE and specifies the minimum ring cadence that will be reported. Report format is one line per silence period and one line per ring period. The length of the silence period is in the form DROF=number in units of 100 ms<CR><LF>, and the length of the ring is in the form DRON=number in units of 100 ms<CR><LF>. The modem may produce a Ring event code after the DRON message if enabled by the y parameter. The y parameter must be set to a value equal to or smaller than the expected ring cadence in order to pass the report to the DTE.
+VDR=0, N/A Disables Distinctive Ring cadence reporting.
+VDR=1, 0 Enables Distinctive Ring cadence reporting. Other call progress result codes (including RING) are reported as normal.
+VDR=1, >0 Enables Distinctive Ring cadence reporting. RING result code is reported after falling edge of the ring pulse (after the DRON report).
+VDR=? Displays the allowed values.
+VDR? Displays the current value.
<table>
<thead>
<tr>
<th>Command:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>#CBAn</td>
<td>Callback Attempts</td>
</tr>
<tr>
<td>Values: n = 1–255</td>
<td></td>
</tr>
<tr>
<td>Default: 4</td>
<td></td>
</tr>
<tr>
<td>Sets the number of callback attempts that are allowed after passwords have been exchanged between modems.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>#CBDn</td>
<td>Callback Delay</td>
</tr>
<tr>
<td>Values: n = 0–255</td>
<td></td>
</tr>
<tr>
<td>Default: 15</td>
<td></td>
</tr>
<tr>
<td>Sets the length of time (in seconds) that the modem waits before calling back the remote modem.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>#CBF?</td>
<td>Callback Failed Attempts Display</td>
</tr>
<tr>
<td>Values: N/A</td>
<td></td>
</tr>
<tr>
<td>Default: N/A</td>
<td></td>
</tr>
<tr>
<td>Requests the number of failed callback passwords since reset or power-up. This number can be stored to nonvolatile memory using the &amp;W command.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>#CBFR</td>
<td>Callback Failed Attempts Reset</td>
</tr>
<tr>
<td>Values: N/A</td>
<td></td>
</tr>
<tr>
<td>Default: N/A</td>
<td></td>
</tr>
<tr>
<td>Resets the number of failed callback passwords to 0. This does not reset the number stored in nonvolatile memory.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>#CBln</td>
<td>Local Callback Inactivity Timer</td>
</tr>
<tr>
<td>Values: n = 1–255</td>
<td></td>
</tr>
<tr>
<td>Default: 20</td>
<td></td>
</tr>
<tr>
<td>Sets the time (in minutes) that the modem waits for a command before forcing the user to enter the setup password again.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>#CBNy=x</td>
<td>Store Callback Password</td>
</tr>
<tr>
<td>Values: y = 0–29</td>
<td></td>
</tr>
<tr>
<td>x = password</td>
<td></td>
</tr>
<tr>
<td>Defaults: None</td>
<td></td>
</tr>
<tr>
<td>Sets the callback security password for the y memory location. The password must have 6 to 10 characters, and cannot include the + or - characters.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>#CBPn</td>
<td>Callback Parity</td>
</tr>
<tr>
<td>Values: n = 0, 1, or 2</td>
<td></td>
</tr>
<tr>
<td>Default: 0</td>
<td></td>
</tr>
<tr>
<td>Sets parity for the callback security messages.</td>
<td></td>
</tr>
<tr>
<td>#CBP0 No parity.</td>
<td></td>
</tr>
<tr>
<td>#CBP1 Odd parity.</td>
<td></td>
</tr>
<tr>
<td>#CBP2 Even parity.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>#CBRy</td>
<td>Callback Security Reset</td>
</tr>
<tr>
<td>Values: y = 0–29</td>
<td></td>
</tr>
<tr>
<td>Default: None</td>
<td></td>
</tr>
<tr>
<td>Clears the password and phone number in the y memory location.</td>
<td></td>
</tr>
</tbody>
</table>
**Appendix F – Modem AT Commands**

<table>
<thead>
<tr>
<th>Command:</th>
<th>#CBSn</th>
<th>Callback Enable/Disable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values:</td>
<td>n = 0, 1, 2, or 3</td>
<td></td>
</tr>
<tr>
<td>Default:</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Description:</td>
<td>#CBS0 Disables callback security. #CBS1 Enables local and remote callback security. #CBS2 Enables remote callback security only. #CBS3 Disables callback security until local hang-up or reset.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>#Pn</th>
<th>Set 11-bit Parity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values:</td>
<td>n = 0 or 1</td>
<td></td>
</tr>
<tr>
<td>Default:</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Description:</td>
<td>#P0 No parity. #P1 Odd parity. #P2 Even parity.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>#Sx</th>
<th>Enter Setup Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values:</td>
<td>x= password (1–8 characters, case sensitive)</td>
<td></td>
</tr>
<tr>
<td>Default:</td>
<td>MTSMODEM</td>
<td></td>
</tr>
<tr>
<td>Description:</td>
<td>Enters the callback security setup password.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command:</th>
<th>#S=x</th>
<th>Store Setup Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values:</td>
<td>x= password (1–8 characters, case sensitive)</td>
<td></td>
</tr>
<tr>
<td>Default:</td>
<td>MTSMODEM</td>
<td></td>
</tr>
<tr>
<td>Description:</td>
<td>Stores a new callback security and remote configuration setup password.</td>
<td></td>
</tr>
</tbody>
</table>
**S-Registers**

Certain modem values, or parameters, are stored in memory locations called S-Registers. Use the S command to read or to alter the contents of S-Registers (see previous section).

<table>
<thead>
<tr>
<th>Register</th>
<th>Unit</th>
<th>Range</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S0</td>
<td>1 ring</td>
<td>0, 1–255</td>
<td>1</td>
<td>Sets the number of rings until the modem answers. ATS0=0 disables auto answer completely.</td>
</tr>
<tr>
<td>S1</td>
<td>1 ring</td>
<td>0–255</td>
<td>0</td>
<td>Counts the rings that have occurred.</td>
</tr>
<tr>
<td>S2</td>
<td>decimal</td>
<td>0–127</td>
<td>43 (+)</td>
<td>Sets ASCII code for the escape sequence character. Values greater than 127 disable escape.</td>
</tr>
<tr>
<td>S3</td>
<td>decimal</td>
<td>0–127</td>
<td>13 (^M)</td>
<td>Sets the ASCII code for the carriage return character.</td>
</tr>
<tr>
<td>S4</td>
<td>decimal</td>
<td>0–127</td>
<td>10 (^J)</td>
<td>Sets the ASCII code for the line feed character.</td>
</tr>
<tr>
<td>S5</td>
<td>decimal</td>
<td>0–32–127</td>
<td>8 (^H)</td>
<td>Sets the ASCII code for the backspace character. Values greater than 32 disable backspace.</td>
</tr>
<tr>
<td>S6</td>
<td>seconds</td>
<td>2–65*</td>
<td>2*</td>
<td>Sets the time the modem waits after it goes off-hook before it begins to dial the telephone number.</td>
</tr>
<tr>
<td>S7</td>
<td>seconds</td>
<td>35–65*</td>
<td>50*</td>
<td>Sets the time the modem waits for a carrier signal before aborting a call. Also sets the wait for silence time for the @ dial modifier.</td>
</tr>
<tr>
<td>S8</td>
<td>seconds</td>
<td>0–65</td>
<td>2</td>
<td>Sets the length of a pause caused by a comma character in a dialing command.</td>
</tr>
<tr>
<td>S9</td>
<td>decimal</td>
<td>0, 1–127</td>
<td>37 (%)</td>
<td>Sets ASCII code for remote configuration escape character. S9=0 disables remote configuration.</td>
</tr>
<tr>
<td>S10</td>
<td>100 ms</td>
<td>1–254</td>
<td>20</td>
<td>Sets how long a carrier signal must be lost before the modem disconnects.</td>
</tr>
<tr>
<td>S11</td>
<td>1 ms</td>
<td>50–150*</td>
<td>95*</td>
<td>Sets spacing and duration of dialing tones.</td>
</tr>
<tr>
<td>S28</td>
<td>decimal</td>
<td>0, 1–255</td>
<td>1</td>
<td>0 disables, 1–255 enables V.34 modulation.</td>
</tr>
<tr>
<td>S30</td>
<td>1 minute</td>
<td>0, 1–255</td>
<td>0</td>
<td>Sets the length of time that the modem waits before disconnecting when no data is sent or received. A value of zero disables the timer. See also the \T command</td>
</tr>
<tr>
<td>S35</td>
<td>decimal</td>
<td>0–1</td>
<td>1</td>
<td>0 disables, 1 enables the V.25 calling tone, which allows remote data/fax/voice discrimination.</td>
</tr>
<tr>
<td>S36</td>
<td>decimal</td>
<td>0–7</td>
<td>7</td>
<td>Specifies the action to take in the event of a negotiation failure when error control is selected. (See S48.)</td>
</tr>
</tbody>
</table>
**S37** \( \text{decimal} \) \( 0–19 \) \( 0 \) Sets the maximum V.34 “upstream” speed at which the modem attempts to connect.
0 = maximum speed
1 = reserved
2 = 1200/75 bps
3 = 300 bps
4 = reserved
5 = 1200 bps
6 = 2400 bps
7 = 4800 bps
8 = 7200 bps
9 = 9600 bps
10 = 12000 bps
11 = 14400 bps
12 = 16800 bps
13 = 19200 bps
14 = 21600 bps
15 = 24000 bps
16 = 26400 bps
17 = 28800 bps
18 = 31200 bps
19 = 33600 bps

**S38** \( \text{decimal} \) \( 0–23 \) \( 1 \) Sets “downstream” data rate where V.90 provides rates of 28,000 to 56,000 bps in increments of 1,333 bps.
0 = V.90 disabled
1 = V.90 auto rate
2 = 28,000 bps
3 = 29,333 bps
4 = 30,666 bps
5 = 32,000 bps
6 = 33,333 bps
7 = 34,666 bps
8 = 36,000 bps
9 = 37,333 bps
10 = 38,666 bps
11 = 40,000 bps
12 = 41,333 bps
13 = 42,666 bps
14 = 44,000 bps
15 = 45,333 bps
16 = 46,666 bps
17 = 48,000 bps
18 = 49,333 bps
19 = 50,666 bps
20 = 52,000 bps
21 = 53,333 bps
22 = 54,666 bps
23 = 56,000 bps

**Upstream data rates:** Upstream V.90 data rates are 4800 to 33,600 bps in 2400 bps increments.

**S43** \( \text{decimal} \) \( 0–1 \) \( 1 \) For testing and debugging only. Enables/disables V.32bis start-up auto mode operation. 0 = disable; 1 = enable.
**S48** decimal 7 or 128 7 Enables (7) or disables (128) LAPM negotiation. The following table lists the **S36** and **S48** configuration settings for certain types of connections.

<table>
<thead>
<tr>
<th><strong>S48</strong>=7</th>
<th><strong>S48</strong>=128</th>
</tr>
</thead>
<tbody>
<tr>
<td>S36=0, 2</td>
<td>LAPM or hang up</td>
</tr>
<tr>
<td>S36=1, 3</td>
<td>LAPM or async</td>
</tr>
<tr>
<td>S36=4, 6</td>
<td>LAPM, MNP, or hang up</td>
</tr>
<tr>
<td>S36=5, 7</td>
<td>LAPM, MNP, or async</td>
</tr>
</tbody>
</table>

**S89** seconds 0, 5–255 10 Sets the length of time in the off-line command mode before the modem goes into standby mode or “sleep mode”. A value of zero prevents standby mode; a value of 1–4 sets the value to 5. Standby mode (sleep mode or low power mode) is controlled by **S89**. It programs the number of seconds of inactivity before the modem will go to sleep. The default value is 0. A value of 0 disables standby mode. The modem will wake on an incoming ring or an AT command.

**S108** decimal 0–3, 6, 7 6 Selects the 56K digital loss if using the modem through a PBX line. The default value is -6 dB loss, the value used when calling from a typical POTS line long distance.

- 0 = -0 dB digital loss, no robbed-bit signaling
- 1 = -3 dB PBX digital loss
- 2 = -2 dB digital loss
- 3 = -3 dB digital loss
- 6 = -6 dB digital loss
- 7 = -0 dB digital loss with robbed-bit signaling
## Result Codes

In command mode your modem can send responses called Result Codes to your computer. Result codes are used by communications programs and can also appear on your monitor.

<table>
<thead>
<tr>
<th>Terse</th>
<th>Verbose</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>OK</td>
<td>Command executed</td>
</tr>
<tr>
<td>1</td>
<td>CONNECT</td>
<td>Modem connected to line</td>
</tr>
<tr>
<td>2</td>
<td>RING</td>
<td>Ring signal detected</td>
</tr>
<tr>
<td>3</td>
<td>NO CARRIER</td>
<td>Carrier signal lost or not detected</td>
</tr>
<tr>
<td>4</td>
<td>ERROR</td>
<td>Invalid command</td>
</tr>
<tr>
<td>5</td>
<td>CONNECT 1200</td>
<td>Connected at 1200 bps</td>
</tr>
<tr>
<td>6</td>
<td>NO DIALTONE</td>
<td>No dial tone detected</td>
</tr>
<tr>
<td>7</td>
<td>BUSY</td>
<td>Busy signal detected</td>
</tr>
<tr>
<td>8</td>
<td>NO ANSWER</td>
<td>No answer at remote end</td>
</tr>
<tr>
<td>9</td>
<td>CONNECT 75</td>
<td>Connected at 75 bps</td>
</tr>
<tr>
<td>10</td>
<td>CONNECT 2400</td>
<td>Connected at 2400 bps</td>
</tr>
<tr>
<td>11</td>
<td>CONNECT 4800</td>
<td>Connected at 4800 bps</td>
</tr>
<tr>
<td>12</td>
<td>CONNECT 9600</td>
<td>Connected at 9600 bps</td>
</tr>
<tr>
<td>13</td>
<td>CONNECT 14400</td>
<td>Connected at 14400 bps</td>
</tr>
<tr>
<td>14</td>
<td>CONNECT 19200</td>
<td>Connected at 19200 bps</td>
</tr>
<tr>
<td>18</td>
<td>CONNECT 57600</td>
<td>Connected at 57600 bps</td>
</tr>
<tr>
<td>24</td>
<td>CONNECT 7200</td>
<td>Connected at 7200 bps</td>
</tr>
<tr>
<td>25</td>
<td>CONNECT 12000</td>
<td>Connected at 12000 bps</td>
</tr>
<tr>
<td>28</td>
<td>CONNECT 38400</td>
<td>Connected at 38400 bps</td>
</tr>
<tr>
<td>40</td>
<td>CONNECT 300</td>
<td>Connected at 300 bps</td>
</tr>
<tr>
<td>55</td>
<td>CONNECT 21600</td>
<td>Connected at 21600 bps</td>
</tr>
<tr>
<td>56</td>
<td>CONNECT 24000</td>
<td>Connected at 24000 bps</td>
</tr>
<tr>
<td>57</td>
<td>CONNECT 26400</td>
<td>Connected at 26400 bps</td>
</tr>
<tr>
<td>58</td>
<td>CONNECT 28800</td>
<td>Connected at 28800 bps</td>
</tr>
<tr>
<td>59</td>
<td>CONNECT 31200</td>
<td>Connected at 31200 bps</td>
</tr>
<tr>
<td>60</td>
<td>CONNECT 33600</td>
<td>Connected at 33600 bps</td>
</tr>
<tr>
<td>70</td>
<td>CONNECT 32000</td>
<td>Connected at 32000 bps</td>
</tr>
<tr>
<td>71</td>
<td>CONNECT 34000</td>
<td>Connected at 34000 bps</td>
</tr>
<tr>
<td>72</td>
<td>CONNECT 36000</td>
<td>Connected at 36000 bps</td>
</tr>
<tr>
<td>73</td>
<td>CONNECT 38000</td>
<td>Connected at 38000 bps</td>
</tr>
<tr>
<td>74</td>
<td>CONNECT 40000</td>
<td>Connected at 40000 bps</td>
</tr>
<tr>
<td>75</td>
<td>CONNECT 42000</td>
<td>Connected at 42000 bps</td>
</tr>
<tr>
<td>76</td>
<td>CONNECT 44000</td>
<td>Connected at 44000 bps</td>
</tr>
<tr>
<td>77</td>
<td>CONNECT 46000</td>
<td>Connected at 46000 bps</td>
</tr>
<tr>
<td>78</td>
<td>CONNECT 48000</td>
<td>Connected at 48000 bps</td>
</tr>
<tr>
<td>79</td>
<td>CONNECT 50000</td>
<td>Connected at 50000 bps</td>
</tr>
<tr>
<td>80</td>
<td>CONNECT 52000</td>
<td>Connected at 52000 bps</td>
</tr>
<tr>
<td>81</td>
<td>CONNECT 54000</td>
<td>Connected at 54000 bps</td>
</tr>
<tr>
<td>82</td>
<td>CONNECT 56000</td>
<td>Connected at 56000 bps</td>
</tr>
<tr>
<td>83</td>
<td>CONNECT 58000</td>
<td>Connected at 58000 bps</td>
</tr>
<tr>
<td>84</td>
<td>CONNECT 60000</td>
<td>Connected at 60000 bps</td>
</tr>
<tr>
<td>86</td>
<td>CONNECT 16800</td>
<td>Connected at 16800 bps</td>
</tr>
<tr>
<td>87</td>
<td>CONNECT 115200</td>
<td>Connected at 115200 bps</td>
</tr>
<tr>
<td>88</td>
<td>DELAYED</td>
<td>Delay is in effect for the dialed number</td>
</tr>
<tr>
<td>89</td>
<td>BLACKLISTED</td>
<td>Dialed number is blacklisted</td>
</tr>
<tr>
<td>90</td>
<td>BLACKLIST FULL</td>
<td>Blacklist is full</td>
</tr>
<tr>
<td>91</td>
<td>CONNECT 230400</td>
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<tr>
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<tr>
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<tr>
<td>113</td>
<td>CONNECT 53333</td>
<td>Connected at 53333 bps</td>
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</tbody>
</table>
*EC is added to these result codes when the extended result codes configuration option is enabled. EC is replaced by one of the following codes, depending on the type of error control connection:

- **V42bis** – V.42 error control (LAP-M) and V.42bis data compression
- **V42** – V.42 error control (LAP-M) only
- **MNP5** – MNP 4 error control and MNP 5 data compression
- **MNP4** – MNP 4 error control only
- **NoEC** – No error control protocol.\)
Index

1
10/100Baset Ethernet, 7

4
47 CFR Part 15 regulations, 46

5
56K operation
digital loss when used with PBX S108, 74

A
Abort timer - S7, 71
Adaptive Answer Result Code Enable command - %A, 59
Add Time Server, 26
Administration Screen, 25
Administrator, 16
Administrator E-mail, 26
Answer command - A, 51
Asynchronous Communications Mode command - &Q, 56
Asynchronous Word Length - $EB, 61
AT Command Control command - %DC, 59
AT commands
#CBA – Callback Attempts, 63
#CBD – Callback Delay, 63
#CBF? – Callback Failed Attempts Display, 63
#CBFR – Callback Failed Attempts Reset, 63
#CBN= – Store Callback Password, 63
#CBP – Callback Parity, 58
#CBR – Callback Security Reset, 64
#CBS – Callback Enable/Disable, 64
&P – Set 11 Bit Parity, 64
#S – Enter Setup Password, 64
#S= – Store Setup Password, 64
$D – DTR Dialing, 61
$EB – Asynchronous Word Length, 61
$MB – Online BPS Speed, 61
$SB – Serial Port Baud Rate, 61
%%ATMTSMODEM – Remote Configuration Escape Sequence, 65
%A – Adaptive Answer Result Code, 59
%B – View Blacklist Numbers, 59
%C – Data Compression Control, 59
%DC – AT Command Control, 59
%E – Fallback and Fall Forward, 59
%H – Direct Connect Enable, 59
%R – Cisco Configuration, 61
%S – Command Speed Response, 61
&D – DTR Control, 55
&F – Load Factory Settings, 55
&G – Guard Tone Control, 55
&K – Flow Control, 55
&L – Leased Line Operation, 56
&P – Pulse Dial Make to Break Ratio, 56
&Q – Asynchronous Communications Mode, 56
&S – Data Set Ready (DSR), 56
&T – Louupback Test, 56
&V – Disply Current Settings, 56
&W – Store Current Configuration, 57
&Z=, 57
+++AT – Escape Sequence, 65
+VDR= - Distinctive Ring Report, 62
A - Answer, 51
\A – Select Maximum MNP Block Size, 57
A/- - Repeat Last Command, 51
AT – Attention Code, 51
B - Communication Standard Setting, 51
\B – Transmit Break, 57
-C – Data Calling Tone, 59
D – Dial, 52
disabling response to, 59
DS= - Dial Stored Number, 52
E – Echo Command Mode, 52
F – Echo Online Datat, 52
H – Hook Control, 52
I – Information Request, 53
\K – Break Control, 58
M – Monitor Speaker Mode, 53
\N – Error Correction Mode, 58
N – Modulation Handshake, 53
O – Return Online to Data, 53
P – Pulse Dialing, 53
\Q – Flow Control, 58
Q – Result Codes Enable/Disable, 53
Sr= - Set Register Value, 54
\T – Inactivity Timer, 58
T = Tone Dialing, 54
\V – Protocol Result Code, 58
V – Result Code Format, 54
\W – XON/XOFF Pass Through, 59
W – Result Code Options, 54
X – Result Code Selection, 54
Z – Resetting the Modem, 54
AT Commands
Enter key, 51
AT commands - #CBI, 63
AT commands - $RP – Ring Priority vs. AT Command Priority, 61
AT commands - Sr? – Read Register Value, 54
Attention code command - AT, 51
Authentication Type, 31
Auto Log Threshold, 20
Autoanswer - 50, 71

B
Backspace character - SS, setting, 71
Bell 212A mode, 51

T

Index

S9 – Remote Configuration Escape Character, 71
Standby mode delay time S89, 74
State, 24
Store Callback Password command - #CBN=, 63, 69
Store Dialing command - &Z – Store Dialing Command, 57
Store Setup Password command - #S=, 64
Subject, 23
Subnet Mask, 25

U

Up Tim, 24
upstream mode, 67
Upstream V.90 data rates S38, 73
User ID, 28
Username, 22

V

V.22 mode, 51
V.22bis Guard Tone Control command - &G, 55
V.25 Data Calling Tone, 59
V.34 modulation - S28, enabling, 71
V.42, 7
V.42 Error Correction, 58
V.42bis, 7
V.42bis data compression, 59
V.44, 7
V.54 Test commands, 56
V.92 commands
#CBA – Callback Attempts, 69
#CBFR – Failed Attempts Reset, 69
#CBI – Local Callback Inactivity Timer, 69
#CBN= - Store Callback Password, 69
#CBP - Callback Parity, 69
#P – Set 11-Bit Parity, 70
#S – Enter Setup Password, 70
#S= - Store Setup Password, 70
+MS? – Reports Current Options, 66
+MS= - Modulation Selection, 66
+MS=? – Reports Supported Options, 66
+PCW= - Call Waiting, 67
+PIG= - PCM Upstream Ignore, 67
+PMH= - Modem on Hold, 67
+PMHF – Modem Hook Flash, 68
+PQC= - Quick Connect, 68
+VCID= - Caller ID, 68
+VDR= - Distinctive Ring Report, 68
V.92 commands - #CBD - Callback Delay, 69
V.92 commands - #CBR – Callback Security Reset, 69
V.92 commands - #CBS – Callbacl Enable/Disable, 70
V.92 mode, 66
V.92 Modem Hook Flash command - +PMHF, 68
V.92/S6K modem, 7
View Numbers in Blacklist command - %B, 59

W

Wait time for dial tone - S6, 71

X

XON/XOFF Pacing Control command - &E, 55